

2016 Air Quality Annual Status Report (ASR)

In fulfilment of Part IV of the
Environment Act 1995
Local Air Quality Management

August 2016

Thurrock Borough Council

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| Date | August 2016 |

Executive Summary: Air Quality in Our Area

Air Quality continues to be an issue and a challenge to deal with within Thurrock. The council has maintained its monitoring network and will continue to do so, the monitoring from both roadside sites and urban background sites show that in the last 5 years concentrations of nitrogen dioxide (NO₂) and particulate matter (PM₁₀ & PM_{2.5}) continue to fall in most locations; the level of decrease is very slight however, and not improving as well as expected. It is important that the council continues to drive forward its action plan measures that are focused on its Air Quality Management Areas (AQMAs), so it can fulfil its commitment to improving air quality within its AQMAs and the whole borough.

The council has recently created a new Action Plan for the recently declared AQMA 24, Tilbury and has also created Action Plans for the two new AQMAs to be declared in July 2016 (AQMA 25) Aveley & (AQMA 26) Purfleet By-Pass. The Council has also produced a new Air Quality and Health Strategy, which has reviewed current evidence on air quality & health within the borough and appraised options to tackle the causes of poor air quality as well as identify policies and actions to reduce exposure.

Air Quality in Thurrock

Air pollution is associated with a number of adverse health impacts. It is recognised as a contributing factor in the onset of heart disease and cancer. Additionally, air pollution particularly affects the most vulnerable in society: children and older people, and those with heart and lung conditions. There is also often a strong correlation with equalities issues, because areas with poor air quality are also often the less affluent areas^{1,2}.

The annual health cost to society of the impacts of particulate matter alone in the UK is estimated to be around £16 billion³.

Thurrock currently has 16 Air Quality Management Areas (AQMAs), these are a result of traffic related pollution along busy roads. Many of these roads are the main commuter routes or used for logistical purposes. They are often saturated with traffic

¹ Environmental equity, air quality, socioeconomic status and respiratory health, 2010

² Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006

³ Defra. Abatement cost guidance for valuing changes in air quality, May 2013

during peak hours and in many of these areas there is relevant public exposure, predominantly in the form of residential dwellings which are in relatively close proximity to these roads. A full list of the AQMAs can be found on the Defra Air Quality website via this web-link:- 1

The main pollutant of concern in Thurrock is nitrogen dioxide (NO₂) and to a lesser extent particulate matter (PM₁₀); both of these pollutants arise from road traffic emissions. Thurrock only has AQMAs which are declared for road traffic based emissions, there are no industrial based AQMAs. The AQMAs are primarily related to NO₂ and the long-term objective or annual mean 40 µg/m⁻³ objective, which is the principal issue in all 16 AQMAs. Out of these AQMAs there are currently four declared for PM₁₀, for the short-term objective or daily mean objective of 35 permitted exceedences of >50 µg/m⁻³.

Later this year an additional two AQMAs will be declared in Thurrock for breaching the annual mean objective for NO₂; one in Aveley High Street and Ship Lane, Aveley and a second declared along the Purfleet By-pass, north of Purfleet. Air Quality Action Plans (AQAPs) along with a new Air Quality Strategy Document (AQSD) have already been devised and can be viewed via the Thurrock Council Website here:- <https://consult.thurrock.gov.uk/portal/tc/pt/transport/aqstrategy>

The Council works in collaboration with the Environment Agency (EA) on any air quality issues from industrial activities within the borough, consulting as necessary on these industrial activities, that is permitting variations/applications which the EA are responsible for under the Integrated Pollution Prevention & Control Directive (IPPC). The Council also carries out its statutory duties under Local Authority integrated Pollution & Prevention Control Regime (LA-IPPC).

The Council has recently completed a detailed study into air quality at three of the locations in the Thurrock AQMA, covering Pilgrims Roundabout, Treacle Mine Roundabout and Elizabeth Road/Devonshire Road roundabout. Nitrogen dioxide concentrations within these locations are some of the highest measured within Thurrock. They are also locations where heavily trafficked roads meet and congestion occurs. Three traffic management options were assessed and of the options tested the introduction of a 30mph speed limit is predicted to have the most

beneficial impact on air quality. It is proposed that work will be undertaken next financial year to implement the speed reduction.

Local Priorities and Challenges

In 2015, a decision was taken by Thurrock Council to develop an integrated Health and Air Quality Strategy through which to tackle the health problems associated with and exacerbated by air pollution within the Borough.

Thurrock's Health and Air Quality Strategy has framed the authority's approach to improving air quality related health and wellbeing throughout the Borough and to reduce air pollution exposure to safe levels for human health. The Strategy provides the context for the Council to manage air quality through a suite of policies to prevent new AQMAs from arising as well as outlining a number of actions and measures to improve air quality in each AQMA with a view to moving towards compliance and future revocation.

The overall strategic aims of this Thurrock Health and Air Quality Strategy are twofold:

1. To improve air quality related health and well-being throughout the Borough;
and
2. To reduce air pollution exposure to safe levels for human health.

How to Get Involved

The public can assist in air pollution matters by continuing to address concerns when they think there is an air quality issue in the borough by reporting it via the web:

<https://www.thurrock.gov.uk/report> or by contacting our contact centre Tel: 01375 652955. The Environmental Health Team will continue to assist and address any such concerns as necessary.

The public can keep informed on local air quality matters from accessing a wealth of information, firstly from the Council's air quality webpage:

<https://www.thurrock.gov.uk/air-quality/air-quality-monitoring>

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They can find out what air quality is in there region from the London Air Quality Network:

http://www.londonair.org.uk/london/asp/publicbulletin.asp?la_id=34&MapType=Google or from the EssexAir website: <http://www.essexair.org.uk/>

The Public can also keep informed on the latest air quality forecasting from the Defra UK-AIR website: <https://uk-air.defra.gov.uk/>

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1 Local Air Quality Management

This report provides an overview of air quality in Thurrock Council during 2015. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) and the relevant Policy and Technical Guidance documents.

The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where an exceedance is considered likely the local authority must declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives. This Annual Status Report (ASR) is an annual requirement showing the strategies employed by Thurrock Council to improve air quality and any progress that has been made.

The statutory air quality objectives applicable to LAQM in England can be found in Table E.1 in Appendix E.

2 Actions to Improve Air Quality

2.1 Air Quality Management Areas

Air Quality Management Areas (AQMAs) are declared when there is an exceedance or likely exceedance of an air quality objective. After declaration, the authority must prepare an Air Quality Action Plan (AQAP) within 12-18 months setting out measures it intends to put in place in pursuit of the objectives.

A summary of AQMAs declared by Thurrock Council can be found in Table 2.1. Further information related to declared or revoked AQMAs, including maps of AQMA boundaries are available online at https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=282

We propose to declare two new AQMAs later this year for breaching the annual mean objective for NO₂, the first is along Aveley High Street and along Ship Lane in Aveley. The second AQMA will be declared along the Purfleet By-pass north of the Purfleet area (see monitoring section). We also propose to amend certain AQMAs (see monitoring section) and also propose to revoke some AQMAs based on a Detailed Assessment Report for NO₂ & PM₁₀ which will be submitted to Defra alongside this report. (see monitoring section).

Table 2.1 – Declared Air Quality Management Areas

| AQMA Name | Pollutants and Air Quality Objectives | City / Town | One Line Description | Action Plan |
|-----------|---------------------------------------|-------------------|---|---|
| AQMA 1 | NO ₂ annual mean | Grays Town Centre | An area encompassing a number of properties along London Road Grays, Orsett Road & Stanley Road Grays | https://consult.thurrock.gov.uk/portal/tc/pt/transport/aqstrategy |

| AQMA Name | Pollutants and Air Quality Objectives | City / Town | One Line Description | Action Plan |
|-----------|--|--|---|---|
| AQMA 2 | NO ₂ annual mean | Grays, South Stifford | An area encompassing Residential properties along London Road South Stifford. | https://consult.thurrock.gov.uk/portal/tc/pt/transport/aqstrategy |
| AQMA 3 | NO ₂ annual mean | Grays | An area encompassing Residential properties along Hogg Lane & Elizabeth Road. | https://consult.thurrock.gov.uk/portal/tc/pt/transport/aqstrategy |
| AQMA 4 | NO ₂ annual mean | Grays, Chafford Hundred | An area encompassing Residential properties along A1306 west of Chafford Hundred Visitor Centre | https://consult.thurrock.gov.uk/portal/tc/pt/transport/aqstrategy |
| AQMA 5 | NO ₂ annual mean PM ₁₀ daily mean | Grays, Chafford Hundred & North Stifford | An area encompassing Residential properties along Warren Terrace A1306 & A13 | https://consult.thurrock.gov.uk/portal/tc/pt/transport/aqstrategy |
| AQMA 7 | NO ₂ annual mean PM ₁₀ daily mean | West Thurrock | A Hotel (IBIS) near to M25 north of the Dartford Crossing | https://consult.thurrock.gov.uk/portal/tc/pt/transport/aqstrategy |
| AQMA 8 | NO ₂ annual mean | West Thurrock | A Hotel next to Jct 31 of the M25 | https://consult.thurrock.gov.uk/portal/tc/pt/transport/aqstrategy |

| AQMA Name | Pollutants and Air Quality Objectives | City / Town | One Line Description | Action Plan |
|-----------|--|------------------------|--|---|
| | PM ₁₀ daily mean | / Purfleet | | port/aqstrategy |
| AQMA 9 | NO ₂ annual mean | West Thurrock / Aveley | A Hotel next to Jct 31 of the M25 | https://consult.thurrock.gov.uk/portal/tc/pt/transport/aqstrategy |
| AQMA 10 | NO ₂ annual mean PM ₁₀ daily mean | Purfleet | An area encompassing Residential properties along London Road Purfleet near to Jarrah Cottages | https://consult.thurrock.gov.uk/portal/tc/pt/transport/aqstrategy |
| AQMA 12 | NO ₂ annual mean | Purfleet | An area encompassing Residential properties along A1306 on the Watts Wood Estate | https://consult.thurrock.gov.uk/portal/tc/pt/transport/aqstrategy |
| AQMA 13 | NO ₂ annual mean | Purfleet / Aveley | An area encompassing Residential properties along A1306 London Road Aveley Arterial Road | https://consult.thurrock.gov.uk/portal/tc/pt/transport/aqstrategy |
| AQMA 15 | NO ₂ annual mean | South Ockendon | 1 residential dwelling near the M25 on the edge of Irvine Gardens | https://consult.thurrock.gov.uk/portal/tc/pt/transport/aqstrategy |
| AQMA 16 | NO ₂ annual mean | Near North | 1 residential dwelling near the M25 off Dennis Road | https://consult.thurrock.gov.uk/portal/tc/pt/transport/aqstrategy |

| AQMA Name | Pollutants and Air Quality Objectives | City / Town | One Line Description | Action Plan |
|-----------|---------------------------------------|---------------|--|---|
| | | Ockendon | | |
| AQMA 21 | NO ₂ annual mean | Purfleet | A former Hotel on Stonehouse Lane | https://consult.thurrock.gov.uk/portal/tc/pt/transport/aqstrategy |
| AQMA 23 | NO ₂ annual mean | West Thurrock | An area encompassing Residential properties along London Road West Thurrock | https://consult.thurrock.gov.uk/portal/tc/pt/transport/aqstrategy |
| AQMA 24 | NO ₂ annual mean | Tilbury | An area encompassing Residential properties along Calcutta Road, Dock Road & St Chads Road | https://consult.thurrock.gov.uk/portal/tc/pt/transport/aqstrategy |
| AQMA 25 | NO ₂ annual mean | Aveley | Pending Declaration An area encompassing Residential properties along Aveley High St & Ship Lane | https://consult.thurrock.gov.uk/portal/tc/pt/transport/aqstrategy |
| AQMA 26 | NO ₂ annual mean | Purfleet | Pending Declaration An area encompassing Residential properties along the Purfleet Bypass | https://consult.thurrock.gov.uk/portal/tc/pt/transport/aqstrategy |

2.2 Progress and Impact of Measures to address Air Quality in the Borough of Thurrock

Thurrock Council has taken the opportunity to review its strategy and approach to managing air quality in the Borough. During the current reporting year of 2015a cross-directorate Air Quality Officer Task Group was established to work more effectively at managing the sources and impacts of poor air quality in Thurrock; and develop and integrated Health and Air Quality Strategy to identify ways to reduce air pollution and public exposure.

In order to improve understanding of the causes and extent of air quality issues in Thurrock the Council undertook a comprehensive review of local data and intelligence to form the basis of the evidence base for the development of the Strategy.

Following on from the preparation of the Thurrock Air Quality and Health Evidence Base it was necessary to consider this evidence in identifying the issues that the Strategy will need to focus on resolving.

The overall strategic aims of this Thurrock Health and Air Quality Strategy are twofold:

- To improve air quality related health and well-being throughout the Borough; and
- To reduce air pollution exposure to safe levels for human health.

In accordance with the above, the Strategy has therefore considered ways to:

Objective 1: Reduce childhood exposure to air pollution, particularly in and around schools;

Objective 2: Encourage people to stay healthy longer by encouraging a modal shift where possible to active modes of transport where safe to do so;

Objective 3: Prioritise public health interventions in AQMAs and health deprived areas; and

Objective 4: Reduce the number of air quality management areas in order to limit exposure to and health impacts from air pollution.

In order to meet the above aims and objectives, it was necessary to set out a suite of policies for effectively managing air quality throughout the Borough which will facilitate decision making on air quality issues and work to prevent new AQMAs from arising wherever possible. Table 2.2 summarises these policies.

Table 2.2 – Thurrock Air Quality Strategy Aims

| | Policy | Summary |
|-------|------------------------|---|
| AGS 1 | Air Quality and Health | <p>To promote good public health in relation to the impacts of poor air quality, public health interventions will be prioritised in Thurrock with:</p> <ul style="list-style-type: none"> • An AQMA; and • In 20% most deprived; or • History of respiratory or cardio vascular problems amongst its residents |

| | Policy | Summary |
|-------|--------------------------------|---|
| AQS 2 | Monitoring and Review | The Council will ensure the whole Borough is modelled at least every five years to ensure that AQMAs remain justified |
| AQS 3 | Declaration | New AQMAs will only be declared where: <ul style="list-style-type: none"> • Modelling indicates an exceedance; and • Relevant receptors exist; and • Three years of diffusion tube data corroborate |
| AQS 4 | Revocation | Annual Status Reports will be used to consider revocation of AQMAs |
| AQS 5 | Action Planning Prioritisation | <ol style="list-style-type: none"> 1. Where pollutant concentrations are highest; followed by 2. AQMAs in most 20% health deprived LSOA; and finally 3. AQMAs where levels are less than 20% below limit value forecast three years in future |
| AQS 6 | Clean Air Zone | Detailed consideration of a CAZ will be triggered if: <ul style="list-style-type: none"> • Other measures not proving to be effective; • New evidence emerges to benefits of CAZs; or • National initiative aimed at their widespread deployment |

| | Policy | Summary |
|-------|---|---|
| AQS 7 | Reducing emissions from transport | The council will deliver transport interventions aimed at reducing emissions from transport generally across the Borough, but in particular within AQMAs. |
| AQS 8 | Development and Air Quality Impacts | When deciding whether air quality is relevant to a planning application, consideration of: <ul style="list-style-type: none"> • Significantly affect traffic • Introduce new point sources of air pollution • Increase exposure to poor air quality • Unacceptable impacts during construction (dust) • Affect biodiversity • Lead to declaration of a new AQMA |
| AQS 9 | Air Quality Assessments for Development Proposals | To address Air Quality concerns the Council may request: <ul style="list-style-type: none"> • Baseline AQ situation; • Whether operational or construction phase could affect AQ; • Significant increase in people exposed to poor AQ; • For major development, 24 hour traffic counts; and • Any mitigation measures required. |

| | Policy | Summary |
|--------|--|--|
| AQS 10 | Air Quality Mitigation and Planning Conditions/Obligations | The Council will work with applicants to consider appropriate mitigation so as to ensure the new development is appropriate for its location and unacceptable risks are prevented. |

The development of the Strategy was also an opportune time to review and revise the existing air quality action plans for each AQMA, as well as develop AQAPs for the new AQMAs in Tilbury (AQMA 24), Aveley (AQMA 25) and Purfleet Bypass (AQMA 26). These action plans focus primarily on the period from 2016 to 2020; although in some cases include some longer term actions as well.

Thurrock Council’s priorities for the coming year are:-

Table 2.2a - Progress on Measures to improve Air Quality within Thurrock’s AQMAs

| | No. | Action | Outcome | Delivery Date | Reference to existing strategy or plan |
|---------------------------------|-----|--------------------------------|---|---------------|--|
| AQMA 10 – London Road, Purfleet | 1 | Engine Switch-Off Switch Zone | 0.5 – 1.0 µg/m ³ (Actions 1 and 2 combined) | Mar 2017 | Thurrock Air Quality and Health Strategy and AQMA Action Plans |
| | 2 | Roadside Emissions Testing | | Mar 2017 | Thurrock Air Quality and Health Strategy and AQMA Action Plans |
| | 3 | HGV Distributor Road/ Dualling | 15.0+ µg/m ³ (Actions 3 and 4 combined) | 2021 | Thurrock Air Quality and Health Strategy and AQMA Action Plans |
| | 4 | Weight Restriction | | 2021 | Thurrock Air Quality and Health Strategy and AQMA Action Plans |

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|--|----|-----------------------------------|---|---|--|
| | 5 | Land Use Planning | No increase | Ongoing | Thurrock Air Quality and Health Strategy and AQMA Action Plans |
| | 6 | Freight Quality Partnership | Inform routing strategies, awareness and liaison | Ongoing | Thurrock Air Quality and Health Strategy and AQMA Action Plans |
| | 7 | Eco-Driver Training | 0.5 µg/m ³ | Ongoing | Thurrock Air Quality and Health Strategy and AQMA Action Plans |
| | 8 | Pollution Retrofit Equipment | 15.0+ µg/m ³ (Actions 8 and 9 combined) | TBD – Dependent on availability of external funding | Thurrock Air Quality and Health Strategy and AQMA Action Plans |
| | 9 | Clean Air Zone | | TBD – Monitoring of AQ and with regard to updated national policy | |
| | 10 | Personalised Journey Planning | 3.0 µg/m ³ overall | TBD – Subject to outcome of volunteer recruitment | Thurrock Air Quality and Health Strategy and AQMA Action Plans |
| | 11 | Business Travel Plans (modeshift) | 1.0 µg/m ³ | Ongoing | Thurrock Air Quality and Health Strategy and AQMA Action Plans |

| | | | | | |
|----------------------------------|----|---|--------------------------|----------|---|
| AQMA 3 –Hogg Lane/Elizabeth Road | 12 | Investigate Mature Landscaping Barrier | 5.0+ µg/m ³ * | Nov 2017 | Thurrock Air Quality and Health Strategy and AQMA Action Plans |
| | 13 | 30 mph limit | 5.0+ µg/m ³ * | Sep 2017 | Thurrock Air Quality and Health Strategy and AQMA Action Plans |
| | 14 | School Travel Plans | 0.5 µg/m ³ | Ongoing | Thurrock Air Quality and Health Strategy and AQMA Action Plans, Sustainable Modes of travel to Schools strategy (SMOTS) |
| | 15 | A1012/A1036 Priority 'hamburger' roundabout feasibility | 5.0+ µg/m ³ * | Sep 2017 | Thurrock Air Quality and Health Strategy and AQMA Action Plans |
| AQMA 5 – A1306 | 16 | Investigate Mature Landscaping Barrier | 5.0+ µg/m ³ * | Nov 2017 | Thurrock Air Quality and Health Strategy and AQMA Action Plans |

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|-----------------------------------|----|--|-----------------------------------|---|---|
| | 17 | Variable Message Signing for Lakeside | 1.0 µg/m3 | 2021 | Thurrock Air Quality and Health Strategy and AQMA Action Plans |
| | 18 | Business Travel Plans (modeshift) | 1.0 µg/m3 | Ongoing | Thurrock Air Quality and Health Strategy and AQMA Action Plans |
| | 19 | Pilgrims Roundabout Signalisation | 5.0+ µg/m3* | Sep 2017 | Thurrock Air Quality and Health Strategy and AQMA Action Plans |
| AQMA 24 – Tilbury (Calcutta Road) | 20 | Engine Switch Off Zone | 3.0+ µg/m3* | Mar 2017 | Thurrock Air Quality and Health Strategy and AQMA Action Plans |
| | 21 | School Travel Plans | 3.0 µg/m3 overall | Ongoing | Thurrock Air Quality and Health Strategy and AQMA Action Plans, Sustainable Modes of travel to Schools strategy (SMOTS) |
| | 22 | Improved Walking and Cycling Infrastructure and marketing and promotion campaign | 3.0 µg/m3 overall | Mar 2018 | Thurrock Air Quality and Health Strategy and AQMA Action Plans |
| | 23 | Personalised Journey Planning | 3.0 µg/m3 overall | TBD – Subject to outcome of volunteer recruitment | Thurrock Air Quality and Health Strategy and AQMA Action Plans |
| | 24 | Eco Driving | 3.0 µg/m3 overall | Sep 2017: Subject to available funding | Thurrock Air Quality and Health Strategy and AQMA Action Plans |
| | 25 | AQ Mitigation in new developments | No increase in at risk population | Ongoing | Thurrock Air Quality and Health Strategy and AQMA Action Plans |
| | 26 | Personalised Journey Planning | 3.0 µg/m3 overall | TBD – Subject to outcome of volunteer recruitment | Thurrock Air Quality and Health Strategy and AQMA Action Plans |
| | 27 | Business Travel Plans (modeshift) | 1.0 µg/m3 | Ongoing | Thurrock Air Quality and Health Strategy and AQMA Action Plans |

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|-----------------------------------|----|---|---|---------------------------------------|---|
| AQMA 25 - Aveley | 28 | HGV Traffic Management Scheme: Stifford Road | 8.0 µg/m3 (Actions 24 and 25 combined) | April 2017 | Thurrock Air Quality and Health Strategy and AQMA Action Plans |
| | 29 | HGV Traffic Management Scheme: Ship Lane | | April 2018 | Thurrock Air Quality and Health Strategy and AQMA Action Plans |
| | 30 | Engine Switch Off Zone | 3.0+ µg/m3* | Mar 2017 | Thurrock Air Quality and Health Strategy and AQMA Action Plans |
| | 31 | School Travel Plans | 3.0 µg/m3 overall | Ongoing | Thurrock Air Quality and Health Strategy and AQMA Action Plans, , Sustainable Modes of travel to Schools strategy (SMOTS) |
| AQMA 26 -- Purfleet Bypass | 32 | Mature Landscaping Barrier | 2.0+ µg/m3* | Nov 2017 | Thurrock Air Quality and Health Strategy and AQMA Action Plans |
| | 33 | Land Use Planning | No further increases | Ongoing | Thurrock Air Quality and Health Strategy and AQMA Action Plans |
| | 34 | Eco-Driver Training | 0.5 µg/m3 | Ongoing: Subject to available funding | Thurrock Air Quality and Health Strategy and AQMA Action Plans |
| AQMA 1, 2, 23 Grays (London Road) | 35 | Engine Switch Off Zone | 0.5 µg/m3 | Mar 2017 | Thurrock Air Quality and Health Strategy and AQMA Action Plans |
| | 36 | School Travel Plans | 0.5 µg/m3 | Ongoing | Thurrock Air Quality and Health Strategy and AQMA Action Plans, Sustainable Modes of travel to Schools strategy (SMOTS) |
| | 37 | Enforcement of Weight Restriction | 3.0 µg/m3 | Sep 2017 | Thurrock Air Quality and Health Strategy and AQMA Action Plans |
| | 38 | Land Use Planning (Gumley Road and Askey Farm Lane) | No increase | Ongoing | Thurrock Air Quality and Health Strategy and AQMA Action Plans |
| | 39 | Eco-Driver Training | 0.5 µg/m3 | Ongoing: Subject to available funding | Thurrock Air Quality and Health Strategy and AQMA Action Plans |

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|--|----|-----------------------------------|-------------------|---|--|
| | 40 | Personalised Journey Planning | 3.0 µg/m3 overall | TBD – Subject to outcome of volunteer recruitment | Thurrock Air Quality and Health Strategy and AQMA Action Plans |
| | 41 | Business Travel Plans (modeshift) | 1.0 µg/m3 | Ongoing | Thurrock Air Quality and Health Strategy and AQMA Action Plans |

Table 2.2b – Progress on Measures to Improve Air Quality as wider-ranging more generalised measures

| Measure No. | Measure | EU Category | EU Classification | Lead Authority | Planning Phase | Implementation Phase | Key Performance Indicator | Target Pollution Reduction in the AQMA | Progress to Date | Estimated Completion Date | Comments |
|-------------|---|-------------------------------|---------------------------|---|----------------|----------------------|---------------------------|--|---|---------------------------|---|
| 1 | Public Awareness Raising & Education | Public Information | via the Internet | Env Protection Team/ Highways & Public Health | Date | Ongoing | N/A | N/A | Effects not quantifiable but may encourage modal shift and lead to long-term improvements | Ongoing | To Inform the Public of the state of Air Quality dissemination of air quality reports and download of AQ data from Thurrock Council website/ LAQN, EssexAir & Defra |
| 2 | Smarter Choices-Work Place Travel Planning : Action to road vehicle emissions | Promoting Travel Alternatives | Workplace Travel Planning | Strategic Planning | | 2012/13 | N/A | <1% | | Ongoing | Encourage modal shift (13 organisations supported since beginning of Local Sustainable Transport Fund (LSTF)) |
| 3 | Action to road vehicle emissions | Promoting Travel Alternatives | Promotion of cycling | Highways / Strategic Planning | | Ongoing | N/A | <1% | | Ongoing | Encourage modal shift |
| 4 | Action to road vehicle emissions | Promoting Travel Alternatives | School Travel Plans | Highways / Strategic Planning | | 2004 | N/A | <1% | | Complete | Encourage modal shift |

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| Measure No. | Measure | EU Category | EU Classification | Lead Authority | Planning Phase | Implementation Phase | Key Performance Indicator | Target Pollution Reduction in the AQMA | Progress to Date | Estimated Completion Date | Comments |
|-------------|---|---------------------------------------|---|-------------------------------|----------------|----------------------|---------------------------|--|------------------|---------------------------|-----------------------|
| 5 | Action to road vehicle emissions | Promoting Travel Alternatives | Promotion of walking | Highways / Strategic Planning | | Ongoing | N/A | <1% | | Ongoing | Encourage modal shift |
| 6 | Action to road vehicle emissions Public Transport (Metrorail) | Promoting Travel Alternatives | Promote use of rail and inland waterways | Highways / Strategic Planning | | Ongoing | N/A | <1% | | Ongoing | Encourage modal shift |
| 7 | Action to road vehicle emissions | Promoting Travel Alternatives | Personalised Travel Planning | Highways / Strategic Planning | | 2010/11 | N/A | <1% | | 2015/16 | Encourage modal shift |
| 8 | Action to road vehicle emissions | Promoting Travel Alternatives | Intensive active travel campaign & infrastructure | Highways / Strategic Planning | | 2010/11 | N/A | <1% | | Ongoing | Encourage modal shift |
| 9 | Action to road vehicle emissions | Transport Planning and Infrastructure | Cycle network | Highways / Strategic Planning | | Ongoing | N/A | <1% | | Ongoing | Encourage modal shift |
| 10 | Action to road vehicle emissions | Transport Planning and Infrastructure | Public transport improvements- interchanges stations and services | Highways / Strategic Planning | | Ongoing | N/A | <1% | | Ongoing | Encourage modal shift |
| 11 | Action to road vehicle emissions | Transport Planning and Infrastructure | Bus route improvements | Highways / Strategic Planning | | Ongoing | N/A | <1% | | Ongoing | Encourage modal shift |

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| Measure No. | Measure | EU Category | EU Classification | Lead Authority | Planning Phase | Implementation Phase | Key Performance Indicator | Target Pollution Reduction in the AQMA | Progress to Date | Estimated Completion Date | Comments |
|-------------|---|----------------------------------|--|-------------------------------|----------------|----------------------|---------------------------|--|---|---------------------------|--|
| 12 | LAPC Inspections, of local industry | Environmental Permits | Other | Environmental Protection team | | 1990 | N/A | N/A | Effects not quantifiable, but probably limits local component of background pollution | Ongoing | Prevention of Pollution & Nuisance |
| 13 | Action to road vehicle emissions (116 drivers trained by SAFED up to March 2013) | Vehicle Fleet Efficiency | Driver training and ECO driving aids | Highways / Strategic Planning | | 2010/11 | N/A | <1% | | 2014/15 | Improve HGV driving efficiency to improve vehicle emissions |
| 14 | Action to road vehicle emissions (ECO Stars Freight Accreditation Scheme, 42 businesses currently have accreditation from the scheme) | Vehicle Fleet Efficiency | Fleet efficiency and recognition schemes | Highways / Strategic Planning | | 2010/11 | N/A | <1% | | 2014/15 | Improve HGV driving efficiency to improve vehicle emissions (funding available until March 2015) |
| 15 | Enforcement of local Taxi licencing | Promoting Low Emission Transport | Taxi Licencing conditions | Licencing | | Ongoing | N/A | <1% | Effects not quantifiable | Ongoing | Ensure that Road vehicles are road worthy and EU compliant vehicles |

Thurrock Borough Council

| Measure No. | Measure | EU Category | EU Classification | Lead Authority | Planning Phase | Implementation Phase | Key Performance Indicator | Target Pollution Reduction in the AQMA | Progress to Date | Estimated Completion Date | Comments |
|-------------|--|---------------------------------------|--|-------------------------------|----------------|----------------------|---------------------------|--|------------------|---------------------------|--|
| 16 | Provision of Electric vehicle car charging points around the borough | Promoting Low Emission Transport | Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging | Highways / Strategic Planning | | 2009 | N/A | <1% | | Ongoing | Alternative fuelled vehicles |
| 17 | Council Introduced Home working / flexible working hours | Promoting Travel Alternatives | Encourage / Facilitate home-working | TBC | | 2014 | N/A | N/A | | Ongoing | To reduce and save money on unnecessary vehicle journeys |
| 18 | Introduction of Hybrid Buses into the fleet | Alternatives to private vehicle use | Other | Highways / Strategic Planning | | Ongoing | N/A | <1% | | Ongoing | Switch from Diesel to less polluting alternatives |
| 19 | Cycle Parking for AQMA 5 | Transport Planning and Infrastructure | Other | Highways / Strategic Planning | | 2013/2014 | N/A | <1% | | Completed | Increase capacity for cycle network |
| 20 | Local Sustainable Transport Fund (LSTF) Improvement of Transport infrastructure (Boroughwide) Initiative | Transport Planning and Infrastructure | Other | Highways / Strategic Planning | | 2010/2014 | N/A | <1% | | Completed | Improvement of Transport Infrastructure |

Thurrock Borough Council

| Measure No. | Measure | EU Category | EU Classification | Lead Authority | Planning Phase | Implementation Phase | Key Performance Indicator | Target Pollution Reduction in the AQMA | Progress to Date | Estimated Completion Date | Comments |
|-------------|--|---------------------------------------|--|--|----------------|----------------------|--|--|---------------------------|---------------------------|--|
| 21 | Freight Quality Partnership (FQP) Expansion of FQP (as of 2014 were 45 members in the FQP in Thurrock (AQMA 23) | Freight and Delivery Management | Freight Partnerships for city centre deliveries | Highways / Strategic Planning | | 2010/11 | N/A | <1% | | 2015/16 | Partnership with local freight and logistic industry to provide discussion platform around freight issues. |
| 22 | Pollution absorbent paint barrier (AQMA 13) | Transport Planning and Infrastructure | Other | Environmental Protection Team /Highways / Strategic Planning | | 2013 | Monitor NO2 diffusion tube results, see if there is an improvement | 1-2% | No noticeable improvement | Complete | Experimental mitigation measure to attempt to reduce NO2 pollution within AQMA 13 |
| 23 | Public Transport - Eco driver training | Transport Planning and Infrastructure | Public transport improvements-interchanges stations and services | Highways / Strategic Planning | | 2014 | N/A | <1% | | ongoing | Improve driver efficiency in the bus fleet (limited application only 16 drivers trained, Ensign bus fleet operators) |
| 24 | Improve traffic signalling at traffic light junction within (AQMA 13) | Traffic Management | Other | Highways / Strategic Planning | | 2013 | N/A | <1% | | 2013 | Improve flow of stationary traffic for smoother driving, hence attempt to lower emissions |

Thurrock Borough Council

| Measure No. | Measure | EU Category | EU Classification | Lead Authority | Planning Phase | Implementation Phase | Key Performance Indicator | Target Pollution Reduction in the AQMA | Progress to Date | Estimated Completion Date | Comments |
|-------------|---|---|--|-------------------------------|----------------|----------------------|---------------------------|--|------------------|---------------------------|---|
| 25 | SCOOT/ UTMC (AQMA 1 & AQMA 5) | Traffic Management | UTC, Congestion management, traffic reduction | Highways / Strategic Planning | | 2014 | N/A | <1% | | 2014 | |
| 26 | HGV weight restriction (AQMA 1, 2) | Traffic Management | Other | Highways / Strategic Planning | | 2013 | N/A | <1% | | 2013 / 2014 | Divert HGVs away from AQMAs along Devonshire road, to alleviate London Road from HGVs & Congestion |
| 27 | Improve Bus / Rail interchange (AQMA 5) | Transport Planning and Infrastructure | Public transport improvements - interchanges stations and services | Highways / Strategic Planning | | Ongoing | N/A | <1% | | Ongoing | Improve accessibility of public transport :Completed scheme, but will make future improvements as part of the Mastplan for Thurrock |
| 28 | Road layout review - future bus priority measures (AQMA 23) | Transport Planning and Infrastructure | Other | Highways / Strategic Planning | | ? | | | | ? Future | |
| 29 | Air Quality Officer Working Group | Policy Guidance and Development Control | Air Quality Planning and Policy Guidance | Environmental Protection Team | | 2014/15 | n/a | n/a | | 2015/16 | To coordinate action between council departments (Health, Transport & Environment) and determine focus areas/initiatives |

Thurrock Borough Council

| Measure No. | Measure | EU Category | EU Classification | Lead Authority | Planning Phase | Implementation Phase | Key Performance Indicator | Target Pollution Reduction in the AQMA | Progress to Date | Estimated Completion Date | Comments |
|-------------|-------------------|---|--|-------------------------------|----------------|----------------------|---------------------------|--|------------------|---------------------------|--|
| 30 | Air Quality Study | Policy Guidance and Development Control | Air Quality Planning and Policy Guidance | Highways / Strategic Planning | | 2014/15 | n/a | n/a | | 2015/16 | To investigate improvement options in AQMA 3, 4 and 5. |
| | | | | | | | | | | | |

2.3 PM_{2.5} – Local Authority Approach to Reducing Emissions and or Concentrations

As detailed in Policy Guidance LAQM.PG16 (Chapter 7), local authorities are expected to work towards reducing emissions and/or concentrations of PM_{2.5} (particulate matter with an aerodynamic diameter of 2.5µm or less). There is clear evidence that PM_{2.5} has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases.

As set out previously, the Council has been working on a new integrated Health and Air Quality Strategy to renew its approach to addressing poor air quality and reduce exposure across its area. The focus of the air quality policies and actions are targeted at exceedances of NO₂ in individual AQMAs, however it is acknowledged that many of the interventions proposed will also have beneficial reductions in PM_{2.5} also. The following measures are examples of interventions proposed to also address PM_{2.5} (see Table 2.2 for full list of interventions proposed):

- Land Use Planning (no increase): Policies focusing on avoiding exacerbating existing AQMAs such as car free developments and promoting sustainable transport.
- HGV Traffic Management (10.0+ µg/m³): Introduction of weight restrictions/enforcement to discourage HGVs
- Engine Switch-off Zones (3.0+ µg/m³): Traffic orders and publicity to reduce idling at level crossings etc
- Speed limit reduction (5.0+ µg/m³): Localised traffic enforcement and speed reductions
- Clean Air Zone (15.0 µg/m³): Traffic enforcement/management to prevent or charge high polluting vehicles for using certain roads

3 Air Quality Monitoring Data and Comparison with Air Quality Objectives and National Compliance

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

This section sets out what monitoring has taken place and how it compares with objectives.

Thurrock Council undertook automatic (continuous) monitoring at four sites during 2015. Table A.1 in Appendix A shows the details of the sites and also provides the latest monitoring results for these sites. NB. Local authorities do not have to report annually on the following pollutants: 1,3 butadiene, benzene, carbon monoxide and lead, unless local circumstances indicate there is a problem, these pollutants have been screened out in previous reports as the levels were low or non-existent within the borough, and no new sources have been identified since for these pollutants so they are no longer deemed as being an issue. National monitoring results are available at <https://uk-air.defra.gov.uk/data/>

Maps showing the location of the monitoring sites are provided in Appendix D. Further details on how the monitors are calibrated and how the data has been adjusted are included in Appendix C.

3.1.2 Non-Automatic Monitoring Sites

Thurrock Council undertook non- automatic (passive) monitoring of NO₂ at 46 sites during 2015 Table A.2 in Appendix A shows the details of the sites.

Maps showing the location of the monitoring sites are provided in Appendix D. Further details on Quality Assurance/Quality Control (QA/QC) and bias adjustment for the diffusion tubes are included in Appendix C.

3.2 Individual Pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for “annualisation” and bias. Further details on adjustments are provided in Appendix C.

3.2.1 Nitrogen Dioxide (NO₂)

Table A.3 in Appendix A compares the ratified and adjusted monitored NO₂ annual mean concentrations for the past 5 years with the air quality objective of 40µg/m³.

For diffusion tubes, the full 2015 dataset of monthly mean values is provided in Appendix B.

Table A.4 in Appendix A compares the ratified continuous monitored NO₂ hourly mean concentrations for the past 5 years with the air quality objective of 200µg/m³, not to be exceeded more than 18 times per year. All of Thurrock's AQMA's are declared for the annual mean objective for NO₂ recent monitoring suggests that this is still the case in most of these AQMA's however for the last few years there has been slight reductions in concentrations in most of these AQMA's and some have been consistently below the objectives for a number of years now.

The Council alongside this report has carried out a Detailed Assessment Report for NO₂ and PM₁₀ (DA 2016) which main aim is to review its AQMA's through conducting detailed Air Quality Modelling using an Advanced Dispersion Model (ADMS), this has been calibrated to the current monitoring data from the year 2014. The report highlights and confirms through the modelling that a number of these AQMA's are now below the annual objective for NO₂ where there was relevant public exposure previously and from this the Council intends to Revoke 8 AQMA's (AQMA's 8,9,12,13,15,16 & 21) for annual Mean NO₂. Also 2 of these (AQMA's 8 & 9) will be revoked for the hourly objective for NO₂. Currently the Council has 4 of these

AQMA's declared for the daily mean PM₁₀ as well (AQMA's 5,7,8 & 10). The modelling confirms that there is no longer an issue with PM₁₀ within these 3 AQMA's, (AQMA's 5,7 & 8) and the Council intends to Revoke these also, but AQMA 10 will still remain declared for PM₁₀.

The overall result will be 10 remaining AQMA's, 9 of which are declared for the annual mean objective for NO₂ (AQMA's (1,2,3,4,5,10,23,24 & 25) with one of these declared for PM₁₀ also (AQMA 10) most of these have decreased in size but a few have also increased in size i.e.(AQMA's 3 & 25). The remaining 1 AQMA is declared solely for the hourly objective for NO₂ as the annual mean objective does not apply here as it is a single dwelling that is designated as a Hotel and not a permanent residence (AQMA 7).

More recent monitoring data for NO₂ for 2015 confirms that this is still the case, and that the Council will be revoking these later this year.

The highest recorded 1-hour concentration in 2015 for NO₂ was at Thurrock 8 at 199 µg/m³ this is below the 200 µg/m³ limit of 18 permitted exceedences annually.

3.2.2 Particulate Matter (PM₁₀)

Table A.5 in Appendix A compares the ratified and adjusted monitored PM₁₀ annual mean concentrations for the past 5 years with the air quality objective of 40µg/m³.

Table A.6 in Appendix A compares the ratified continuous monitored PM₁₀ daily mean concentrations for the past 5 years with the air quality objective of 50µg/m³, not to be exceeded more than 35 times per year.

2015 monitoring along with detailed modelling from 2014 confirms that there are currently no areas breaching the air quality objectives for PM₁₀. However there are some exceedences from automatic monitoring stations over 2015. Thurrock 8 had (10 exceedences of the permitted 35 exceedences), Thurrock 1 had (2 exceedences of the permitted 35 exceedences), and Thurrock 3 had (2 exceedences of the permitted 35 exceedences).

3.2.3 Particulate Matter (PM_{2.5})

Table A.7 in Appendix A presents the ratified and adjusted monitored PM_{2.5} annual mean concentrations for the past 5 years. Thurrock Council currently has one

automatic monitoring station (Thurrock 3; Stanford Le-Hope), which is a roadside site that monitors PM_{2.5}. The site has seen a year on year decrease in concentrations of PM_{2.5} since it first started operating. PM_{2.5} concentrations have reduced from 17.93 µg/m³ in 2011 to 10.06 µg/m³ in 2015.

3.2.4 Sulphur Dioxide (SO₂)

Table A.8 in Appendix A compares the ratified continuous monitored SO₂ concentrations for year 2015 with the air quality objectives for SO₂.

There are currently two locations monitoring SO₂ within the borough, Thurrock 1, Grays and Thurrock 4, Tilbury. There have been no pollution incidences regarding this pollutant since monitoring began back in 1996 at Thurrock 1, SO₂ concentrations fall year on year and remain very low, well below the air quality objectives.

Appendix A: Monitoring Results

Table A.1 – Details of Automatic Monitoring Sites

| Site ID | Site Name | Site Type | X OS Grid Ref | Y OS Grid Ref | Pollutants Monitored | In AQMA? | Monitoring Technique | Distance to Relevant Exposure (m) ⁽¹⁾ | Distance to kerb of nearest road (m) ⁽²⁾ | Inlet Height (m) |
|---|----------------------------|------------------|------------------|------------------|--|----------|---|--|---|------------------|
| Thurrock 1 (TK1) | Thurrock, Grays AURN | Urban Background | 561066 | 177894 | NO ₂ PM ₁₀ O ₃ SO ₂ | No | Chemiluminescent TEOM FDMS UV absorption UV Fluorescence | 38 | Y | 3.5 |
| Thurrock 8 (TK8) & Formerly *(TK2) | Purfleet, London Road | Roadside | 556701 *(556737) | 177937 *(177928) | NO ₂ PM ₁₀ | Yes | Chemiluminescent Beta Attenuated Mass | 2.6 | Y | 1.5 |
| Thurrock 3 (TK3) | Stanford-le-Hope, Manorway | Roadside | 569358 | 182736 | NO ₂ PM ₁₀ PM _{2.5} | No | Chemiluminescent TEOM FDMS TEOM FDMS | 3 | Y | 2.8 |
| Thurrock 4 (TK4) | Tilbury, Calcutta Road | Roadside | 563900 | 176282 | NO ₂ SO ₂ | Yes | Chemiluminescent UV Fluorescence | 5.5 | Y | 1.5 |

(1) 0m if the monitoring site is at a location of exposure (e.g. installed on the façade of a residential property).

(2) N/A if not applicable.

Table A.2 – Details of Non-Automatic Monitoring Sites

| Site ID | Site Name | Site Type | X OS Grid Ref | Y OS Grid Ref | Pollutants Monitored | In AQMA? | Distance to Relevant Exposure (m) ⁽¹⁾ | Distance to kerb of nearest road (m) ⁽²⁾ | Tube collocated with a Continuous Analyser? | Height (m) |
|---------|---------------------------|-----------|---------------|---------------|----------------------|----------|--|---|---|------------|
| LRAR | London Road Arterial Road | R | 555301 | 179438 | NO2 | 13 | N | 0.5 | N | 1.5 |
| PRS | Purfleet Rail Station | R | 555389 | 178145 | NO2 | No | N | 1.5 | N | 2 |
| WC | Watts Crescent | R | 556314 | 178765 | NO2 | 12 | N | 2 | N | 2 |
| JC | Jarrah Cottages | R | 556701 | 177937 | NO2 | 10 | N | 2.6 | Y (TK8) | 1.5 |
| STON | Stonehouse Lane | R | 557132 | 177970 | NO2 | 21 | N | 30 | N | 1.5 |
| IBIS | Ibis Hotel | UB | 557570 | 177789 | NO2 | 7 | N | 52 | N | 2 |
| GDSO | Gatehope Drive | UB | 557595 | 181060 | NO2 | 15 | Y (23m) | 105 | N | 1.25 |
| LT | Lakeside Tesco Roundabout | R | 557981 | 178700 | NO2 | No | N | 1 | N | 2 |

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|------|-------------------------------|----|--------|--------|-----|----|---------|-----|---------|-----|
| KCNO | Kemps Cottage | UB | 558148 | 183532 | NO2 | 16 | Y (10m) | 57 | N | 2 |
| WT | London Road W Thurrock | R | 558483 | 177678 | NO2 | 23 | N | 4 | N | 1.5 |
| HR | Howard Road | R | 559118 | 179462 | NO2 | 5 | Y (0m) | 29 | N | 1.5 |
| NAS2 | A1306 | R | 559720 | 179630 | NO2 | 5 | N | 4.5 | N | 2 |
| LRSS | London Road South Stifford | R | 559785 | 177910 | NO2 | 2 | N | 3.5 | N | 2 |
| LRG | London Road Grays | R | 560624 | 177811 | NO2 | 1 | N | 2.5 | N | 2 |
| NAS4 | Wingfield Grays | UB | 560772 | 178434 | NO2 | No | Y | N/A | N | 1.5 |
| ER | Elizabeth Road | R | 560954 | 179535 | NO2 | 3 | N | 0.5 | N | 2 |
| PS | Poison Store AURN Site | UB | 561066 | 177894 | NO2 | 1 | N | 38 | Y (TK1) | 3.5 |
| HL | Hogg Lane | R | 561108 | 178922 | NO2 | 3 | N | 1.2 | N | 2 |
| NAS1 | Queensgate Centre Grays | R | 561469 | 178063 | NO2 | 1 | Y (0m) | 5 | N | 2 |
| CR | Cromwell Road Grays | I | 561572 | 178154 | NO2 | 1 | N | 0.5 | N | 2 |

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|-------|--|----|--------|--------|-----|--------|----------|-----|---------|------|
| SRG | Stanley Road Grays | R | 561685 | 177833 | NO2 | 1 | Y (2.5m) | 5 | N | 2 |
| NAS3 | Chestnut Avenue Grays | UB | 561830 | 179878 | NO2 | No | Y | N/A | N | 1.5 |
| WES | William Edwards School | R | 561958 | 180967 | NO2 | No | N | N/A | N | 2 |
| B | Bulphan | RB | 563855 | 184772 | NO2 | No | N | N/A | N | 2 |
| TL | Calcutta Road Tilbury | R | 563867 | 176293 | NO2 | No | N | 0.5 | N | 2 |
| PKSL | Park Road | R | 567781 | 182400 | NO2 | No | Y (24m) | 9 | N | 2 |
| SL | Stanford Library | UB | 568501 | 182459 | NO2 | No | N | N/A | N | 2 |
| M | Manorway Monitoring Station | R | 569357 | 182737 | NO2 | No | N | 3 | Y (TK3) | 2.75 |
| FRC | Francisco Close (Chafford Hundred) | I | 559136 | 179084 | NO2 | No | Y (10m) | 17 | N | 2 |
| SLHRS | Stanford-le-Hope Railway Station | R | 568162 | 182296 | NO2 | No | N | 4.5 | N | 2 |
| ETRS | East Tilbury Rail Station | R | 567655 | 179003 | NO2 | No | Y | 2.5 | N | 1.5 |
| TILA | Dock Road (Tilbury) | R | 563498 | 176483 | NO2 | { 24 } | N | 2.5 | N | 2 |

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|-----------|---|----|--------|--------|-----|--------|----------|------|---------|-----|
| TILB | Broadway Intersection (Tilbury) | R | 563645 | 176348 | NO2 | { 24 } | N | 2.5 | N | 2 |
| TILC | St Andrews Road (Tilbury) | R | 563600 | 176321 | NO2 | No | N | 2.5 | N | 1.5 |
| TILD | Calcutta Road East (Tilbury) | R | 563995 | 176291 | NO2 | { 24 } | N | 0.5 | N | 2 |
| TILE | Calcutta Road North (Tilbury) | R | 563870 | 176305 | NO2 | { 24 } | N | 2 | N | 2 |
| TK4 (A&B) | Thurrock 4 (co-located duplicated site) | R | 563900 | 176282 | NO2 | { 24 } | Y | 5.5 | Y (TK4) | 1.5 |
| PBP | Purfleet By-pass | R | 556257 | 178438 | NO2 | No | Y (5.5m) | 9.5 | N | 1.5 |
| PBPA | Purfleet By-pass | R | 556221 | 178461 | NO2 | No | Y (3.2m) | 9.5 | N | 1.5 |
| LYD | Lydden | UB | 560057 | 179873 | NO2 | 4 | Y (26m) | 18 | N | 2 |
| AVSL | Aveley Ship Lane | R | 556713 | 180167 | NO2 | No | Y (1m) | 2 | N | 2 |
| AVHS | Aveley High Street | R | 556661 | 180180 | NO2 | No | N | 0.75 | N | 2 |
| SOAA | South Ockendon Arisdale Avenue | R | 558785 | 182323 | NO2 | No | Y (6 m) | 7 | N | 2 |
| TSR | Tilbury Sydney Road | UB | 564122 | 176152 | NO2 | No | N | N/A | N | 2 |

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|--------|----------------------------------|----|--------|--------|-----|----|-----------|------|---|-----|
| DR | Devonshire Road | R | 560279 | 178944 | NO2 | No | Y (10.5m) | 6 | N | 1.5 |
| LRARN | London Road Art Road (North) | R | 555286 | 179501 | NO2 | 13 | Y (0.5m) | 19.5 | N | 2 |
| LRARS | London Road Art Road (South) | R | 555357 | 179362 | NO2 | 13 | Y (40m) | 15 | N | 1 |
| LRARMN | London Road Art Road (Mid-North) | R | 555299 | 179453 | NO2 | 13 | N | 8 | N | 2 |
| LRARMS | London Road Art Road (Mid-South) | R | 555329 | 179397 | NO2 | 13 | N | 7 | N | 2 |
| JRP | Joslin Road Purfleet | UB | 556395 | 178002 | NO2 | No | N | N/A | N | 2 |

(1) 0m if the monitoring site is at a location of exposure (e.g. installed on/adjacent to the façade of a residential property).

(2) N/A if not applicable.

Table A.3 – Annual Mean NO₂ Monitoring Results

| Site ID | Site Type | Monitoring Type | Valid Data Capture for Monitoring Period (%) ⁽¹⁾ | Valid Data Capture 2015 (%) ⁽²⁾ | NO ₂ Annual Mean Concentration (µg/m ³) ⁽³⁾ | | | | |
|-------------|-----------------------|-----------------|---|--|---|--------------|--------------|---------------------------|---------------------------|
| | | | | | 2011 | 2012 | 2013 | 2014 | 2015 |
| Thurrock 1 | Urban Background (UB) | Automatic | 99% | 99% | 28.17 | 28.72 | 27.46 | 26.46 | 25.4 |
| Thurrock 3 | Roadside (R) | Automatic | 98.9% | 98.9% | 33.92 | 32.76 | 30.04 | 25.07 | 22.9 |
| Thurrock 4 | R | Automatic | 98.9% | 98.9% | 38.56 | 39.3 | 34.55 | 32.77 | 30 |
| Thurrock 8 | R | Automatic | 89.5% | 89.5% | 62.27 | 62.65 | 62.84 | 61.04 | 55.5 |
| LRAR | R | Diffusion Tube | 92% | 92% | 50.27 | 57.23 | 58.28 | 58.52 | 52.15 |
| PRS | R | Diffusion Tube | 100% | 100% | 31.88 | 35.71 | 35.26 | 34.7 | 33.5 |
| WC | R | Diffusion Tube | 92% | 92% | 38.7 | 40.54 | 43.43 | 40.68 | 38.58 |
| JC | R | Diffusion Tube | 100% | 100% | 47.03 | 52.51 | 58.84 | 56.76 | 53.43 |
| STON | R | Diffusion Tube | N/A | N/A | 40.5 | 42.49 | 41.38 | Site Ended 12/2013 | Site Ended 12/2013 |
| IBIS | UB | Diffusion Tube | 75% | 75% | 46.02 | 45.78 | 46.25 | 49.12 | 52.65 |
| GDSO | UB | Diffusion Tube | 100% | 100% | 29.47 | 30.28 | 28.46 | 28.58 | 27.81 |
| LT | R | Diffusion Tube | 100% | 100% | 52.31 | 53.73 | 61.99 | 50.05 | 52.39 |
| KCNO | UB | Diffusion Tube | 100% | 100% | 32.63 | 34.22 | 35.21 | 34.25 | 34.19 |
| WT | R | Diffusion Tube | 100% | 100% | 38.8 | 43.9 | 40.13 | 38.68 | 38.7 |
| HR | R | Diffusion Tube | 100% | 100% | 29.2 | 30.85 | 31.41 | 31.01 | 30.23 |
| NAS2 | R | Diffusion Tube | 100% | 100% | 53.04 | 53.93 | 51.69 | 50.02 | 50.27 |
| LRSS | R | Diffusion Tube | 100% | 100% | 43.08 | 49.33 | 44.76 | 40.63 | 40.48 |
| LRG | R | Diffusion Tube | 92% | 92% | 37.51 | 38.69 | 39.74 | 37.73 | 37.55 |

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| Site ID | Site Type | Monitoring Type | Valid Data Capture for Monitoring Period (%) ⁽¹⁾ | Valid Data Capture 2015 (%) ⁽²⁾ | NO ₂ Annual Mean Concentration (µg/m ³) ⁽³⁾ | | | | |
|---------|--------------------|-----------------|---|--|---|--------------|--------------|--------------------|--------------------|
| | | | | | 2011 | 2012 | 2013 | 2014 | 2015 |
| NAS4 | UB | Diffusion Tube | N/A | N/A | 21.51 | 21.75 | 20.88 | Site Ended 12/2013 | Site Ended 12/2013 |
| ER | R | Diffusion Tube | 100% | 100% | 46.95 | 53.48 | 56.68 | 52.69 | 52.94 |
| PS | UB | Diffusion Tube | 100% | 100% | 26.04 | 27.11 | 27.72 | 26.23 | 24.92 |
| HL | R | Diffusion Tube | 100% | 100% | 29.93 | 33.87 | 33.3 | 35.09 | 31.32 |
| NAS1 | R | Diffusion Tube | 100% | 100% | 34.19 | 33.12 | 35.01 | 32.86 | 30.06 |
| CR | Intermediate (I) | Diffusion Tube | 100% | 100% | 30.84 | 36.06 | 31.95 | 33 | 32.74 |
| SRG | R | Diffusion Tube | 100% | 100% | 27.95 | 31.14 | 33.09 | 30.52 | 27.9 |
| NAS3 | UB | Diffusion Tube | 100% | 100% | 22.48 | 23.69 | 22.67 | 21.71 | 21.05 |
| WES | R | Diffusion Tube | 100% | 100% | 28.37 | 31.77 | 31.38 | 30.28 | 29.85 |
| B | RB | Diffusion Tube | 92% | 92% | 18.36 | 20.61 | 18.44 | 17.51 | 16.26 |
| TL | R | Diffusion Tube | 92% | 92% | 35.74 | 40.54 | 37.13 | 35.17 | 31.96 |
| PKSL | R | Diffusion Tube | 100% | 100% | 30.69 | 33.34 | 31.01 | 28.62 | 28.02 |
| SL | UB | Diffusion Tube | 100% | 100% | 26.34 | 25.93 | 27.34 | 25.55 | 24.92 |
| M | R | Diffusion Tube | 100% | 100% | 32.65 | 34.35 | 32.74 | 25.44 | 25.7 |
| FRC | I | Diffusion Tube | 100% | 100% | 29.50 | 32.6 | 34.34 | 33.66 | 31.92 |
| SLHRS | R | Diffusion Tube | N/A | N/A | 30.21 | 28.12 | 29.45 | Site Ended 12/2013 | Site Ended 12/2013 |
| ETRS | R | Diffusion Tube | N/A | N/A | 27.75 | 31.46 | 28.35 | Site Ended 12/2013 | Site Ended 12/2013 |
| TILA | R | Diffusion Tube | 100% | 100% | 32.3 | 43.15 | 40.32 | 39.79 | 37.75 |
| TILB | R | Diffusion Tube | 100% | 100% | 40.44 | 42.64 | 42.03 | 39.25 | 37.96 |
| TILC | R | Diffusion Tube | 83% | 83% | 38.64 | 43.83 | 40.39 | 37.44 | 34.13 |

Thurrock Borough Council

| Site ID | Site Type | Monitoring Type | Valid Data Capture for Monitoring Period (%) ⁽¹⁾ | Valid Data Capture 2015 (%) ⁽²⁾ | NO ₂ Annual Mean Concentration (µg/m ³) ⁽³⁾ | | | | |
|-----------|-----------|-----------------|---|--|---|------------------------|--------------|--------------|--------------|
| | | | | | 2011 | 2012 | 2013 | 2014 | 2015 |
| TILD | R | Diffusion Tube | 100% | 100% | 33.52 | 39.09 | 38.08 | 33.53 | 32.55 |
| TILE | R | Diffusion Tube | 100% | 100% | 33.12 | 36.9 | 35.26 | 35.46 | 33.14 |
| TK4 (A&B) | R | Diffusion Tube | 100% | 100% | 31.54 | 36.06 | 32.79 | 30.72 | 30.86 |
| PBP | R | Diffusion Tube | 92% | 92% | (<75%) 41.96 | 41.11 | 40.69 | 38.09 | 37.00 |
| PBPA | R | Diffusion Tube | 100% | 100% | No Data | No Data | No Data | 35.66 | 32.93 |
| LYD | UB | Diffusion Tube | 92% | 92% | No Data | 35.97 | 34.42 | 34.11 | 30.94 |
| AVSL | R | Diffusion Tube | 92% | 92% | No Data | 46.99 | 45.15 | 45.43 | 42.27 |
| AVHS | R | Diffusion Tube | 92% | 92% | No Data | (<75%) 38.96 | 39.41 | 38.5 | 37.51 |
| SOAA | R | Diffusion Tube | 100% | 100% | No Data | 32.01 | 33.03 | 32.68 | 31.31 |
| TSR | UB | Diffusion Tube | 100% | 100% | No Data | 33.27 | 31.88 | 26.87 | 28.65 |
| DR | R | Diffusion Tube | 100% | 100% | No Data | (<75%) 30.93 | 29.79 | 32.91 | 30.01 |
| LRARN | R | Diffusion Tube | 100% | 100% | 30.46 | 34.26 | 33.93 | 34.73 | 32.81 |
| LRARS | R | Diffusion Tube | 100% | 100% | 28.62 | 31.55 | 30 | 32.6 | 27.73 |
| LRARMN | R | Diffusion Tube | 100% | 100% | No Data | (<75%) 44.52 | 44.51 | 43.39 | 38.10 |
| LRARMS | R | Diffusion Tube | 100% | 100% | No Data | (<75%) 39.35 | 38.79 | 39.67 | 33.87 |
| JRP | UB | Diffusion Tube | 100% | 100% | No Data | No Data | No Data | No Data | 27.25 |

Notes: Exceedances of the NO₂ annual mean objective of 40µg/m³ are shown in **bold**.

NO₂ annual means exceeding 60µg/m³, indicating a potential exceedance of the NO₂ 1-hour mean objective are shown in **bold and underlined**.

(1) data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

(3) Means for diffusion tubes have been corrected for bias. All means have been "annualised" as per Technical Guidance LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Figure 1: Rolling Annual Mean for NO₂ (automatic monitoring sites)

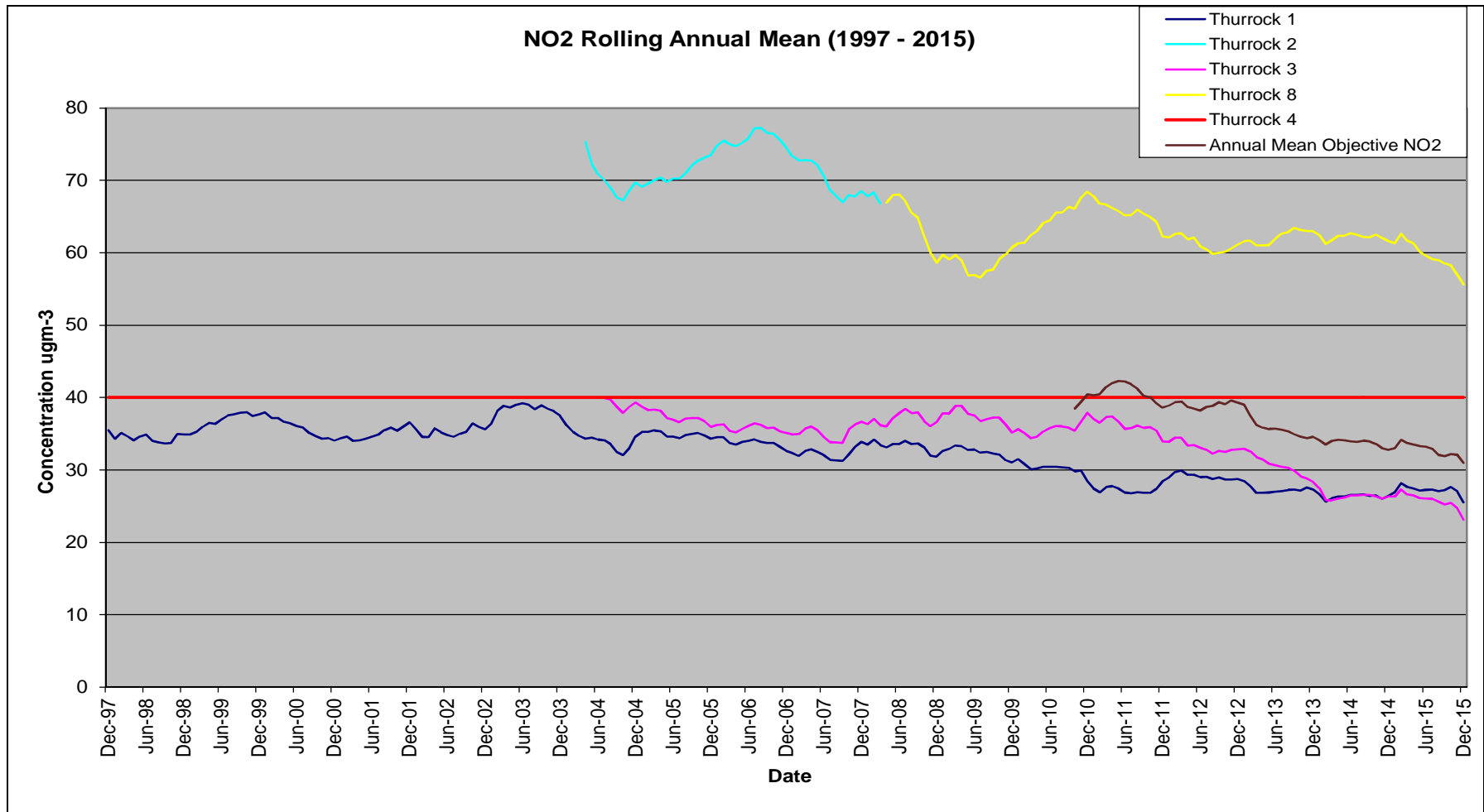


Figure 2: Rolling Annual Mean for NO_x (automatic monitoring sites)

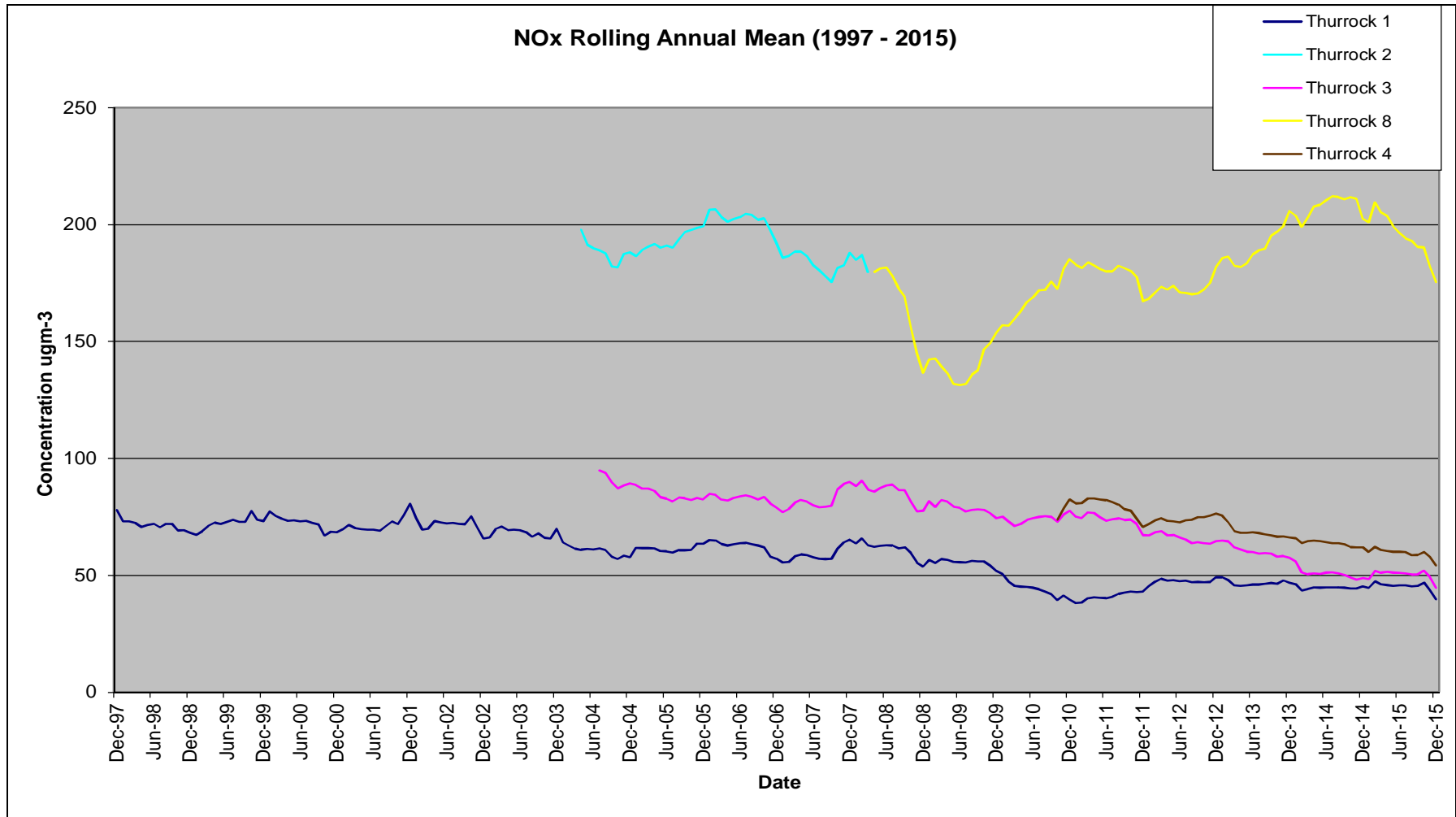


Figure 3: Rolling Annual Mean for % NO₂ of NO_x (automatic monitoring sites)

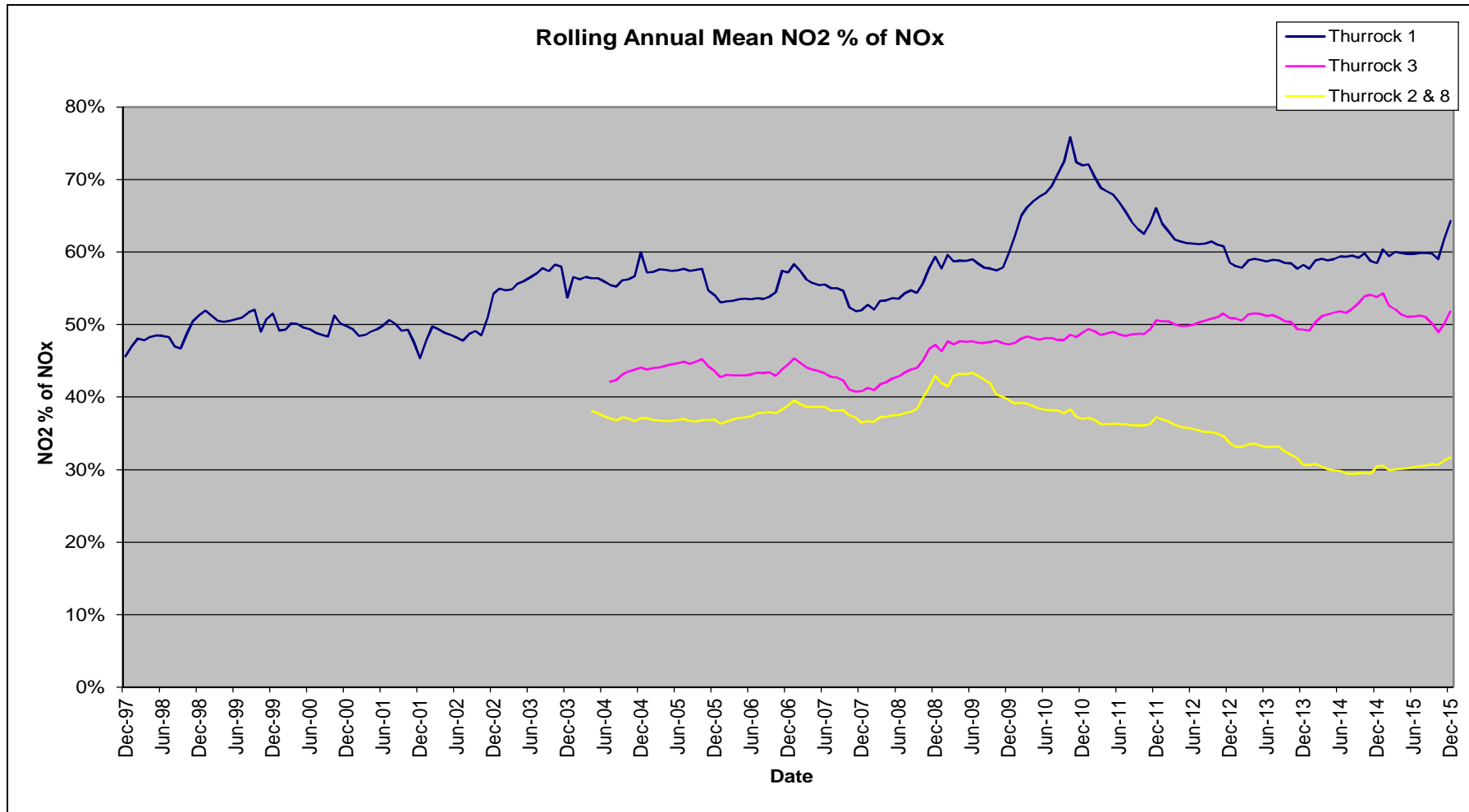


Table A.4 – 1-Hour Mean NO₂ Monitoring Results

| Site ID | Site Type | Monitoring Type | Valid Data Capture for Monitoring Period (%) ⁽¹⁾ | Valid Data Capture 2015 (%) ⁽²⁾ | NO ₂ 1-Hour Means > 200µg/m ³ ⁽³⁾ | | | | |
|------------|------------------|-----------------|---|--|--|----------------|------|------|------|
| | | | | | 2011 | 2012 | 2013 | 2014 | 2015 |
| Thurrock 1 | Urban Background | Automatic | 99% | 99% | 0 (97.1) | 0 | 0 | 0 | 0 |
| Thurrock 3 | Roadside | Automatic | 98.9% | 98.9% | 0 | 0 | 0 | 0 | 0 |
| Thurrock 4 | Roadside | Automatic | 98.9% | 98.9% | 0 | 0 | 0 | 0 | 0 |
| Thurrock 8 | Roadside | Automatic | 89.5% | 89.5% | 4 | 7 (181) | 5 | 5 | 0 |

Notes: Exceedances of the NO₂ 1-hour mean objective (200µg/m³ not to be exceeded more than 18 times/year) are shown in **bold**.

(1) data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

(3) If the period of valid data is less than 85%, the 99.8th percentile of 1-hour means is provided in brackets.

Table A.5 – Annual Mean PM₁₀ Monitoring Results

| Site ID | Site Type | Valid Data Capture for Monitoring Period (%) ⁽¹⁾ | Valid Data Capture 2015 (%) ⁽²⁾ | PM ₁₀ Annual Mean Concentration (µg/m ³) ⁽³⁾ | | | | |
|------------|------------------|---|--|--|-----------------------------|-------|-------|--|
| | | | | 2011 | 2012 | 2013 | 2014 | 2015 |
| Thurrock 1 | Urban Background | 98.3 | 98.3 | 24.85 | 17.65 | 19.16 | 19.28 | 17.08 |
| Thurrock 3 | Roadside | 66.59 | 66.59 | 23.37 | ⁽¹⁾ 22.57 | 24.33 | 19.76 | 16.98 ⁽³⁾ (17.14) |
| Thurrock 8 | Roadside | 98.85 | 98.85 | 27.71 | 23.91 | 27.43 | 26.83 | 24.87 |

Notes: Exceedances of the PM₁₀ annual mean objective of 40µg/m³ are shown in **bold**.

(1) data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

(3) All means have been “annualised” as per Technical Guidance LAQM.TG16, valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Figure 4: Rolling Annual Mean for PM₁₀ (automatic monitoring sites)

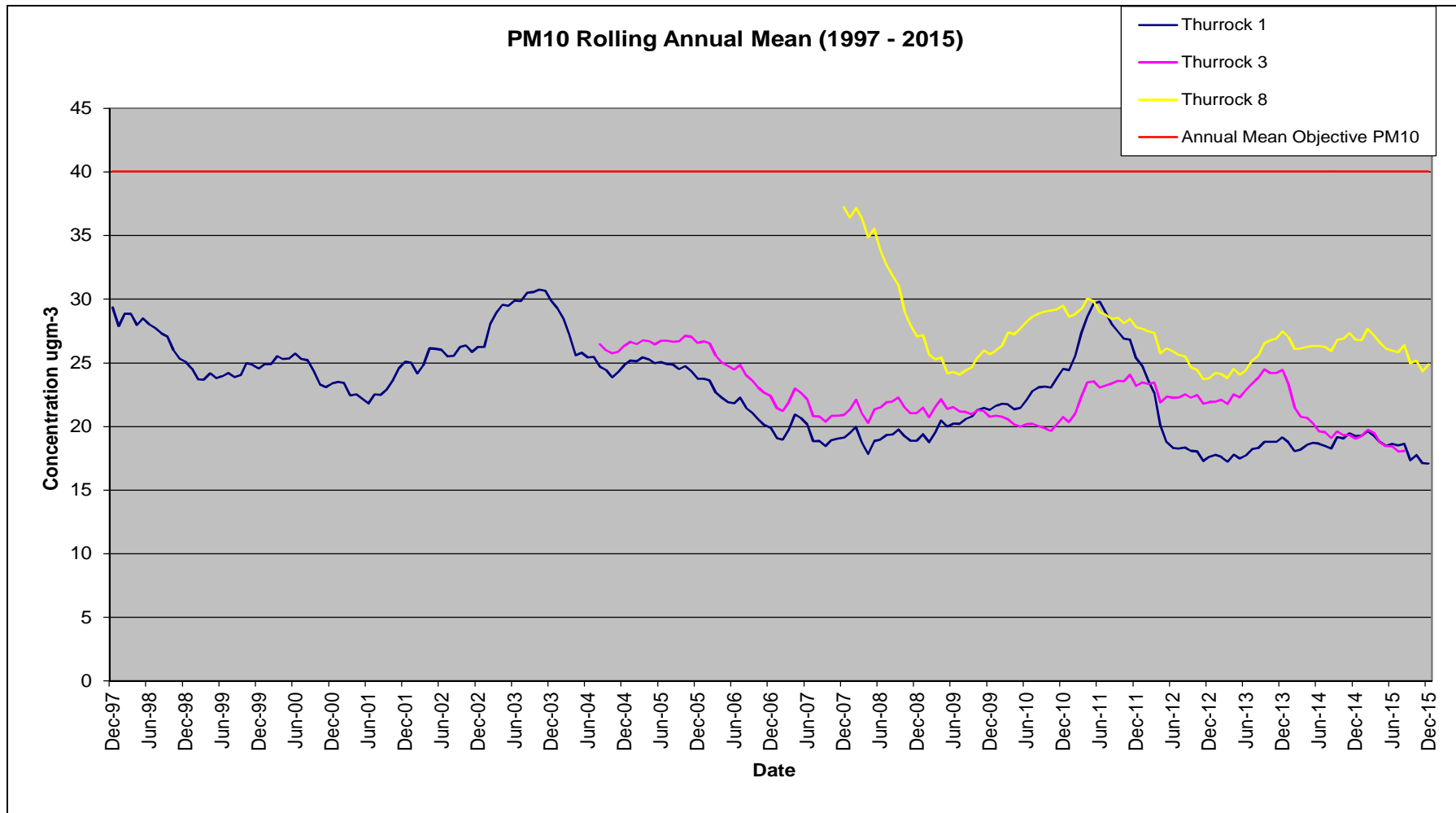


Table A.6 – 24-Hour Mean PM₁₀ Monitoring Results

| Site ID | Site Type | Valid Data Capture for Monitoring Period (%) ⁽¹⁾ | Valid Data Capture 2015 (%) ⁽²⁾ | PM ₁₀ 24-Hour Means > 50µg/m ³ ⁽³⁾ | | | | |
|------------|------------------|---|--|---|-------------------------------|------|------|--------------------------------|
| | | | | 2011 | 2012 | 2013 | 2014 | 2015 |
| Thurrock 1 | Urban Background | 98.3 | 98.3 | 25 | 10 | 4 | 11 | 2 |
| Thurrock 3 | Roadside | 66.59 | 66.59 | 18 | 14 ⁽³⁾ (43) | 16 | 9 | 2 ⁽³⁾ (29.5) |
| Thurrock 8 | Roadside | 98.85 | 98.85 | 24 | 14 | 21 | 22 | 22 |

Notes: Exceedances of the PM₁₀ 24-hour mean objective (50µg/m³ not to be exceeded more than 35 times/year) are shown in **bold**.

(1) data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

(3) If the period of valid data is less than 85%, the 90.4th percentile of 24-hour means is provided in brackets.

Figure 5: Rolling Daily Mean Exceedences for PM₁₀ (automatic monitoring sites)

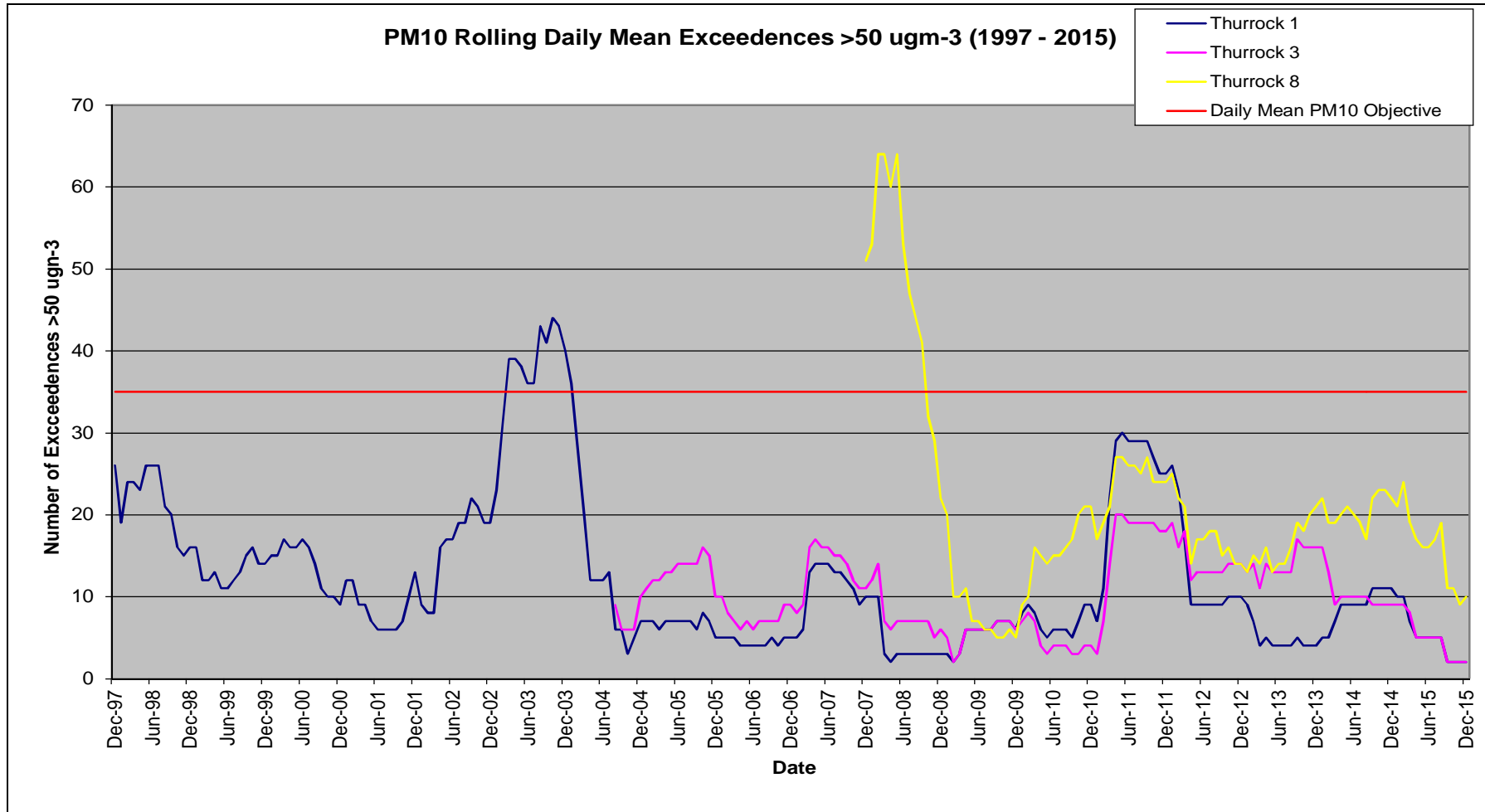


Table A.7 – PM_{2.5} Monitoring Results

| Site ID | Site Type | Valid Data Capture for Monitoring Period (%) ⁽¹⁾ | Valid Data Capture 2015 (%) ⁽²⁾ | PM _{2.5} Annual Mean Concentration (µg/m ³) ⁽³⁾ | | | | |
|------------|-----------|---|--|---|-------|-------|-------|-------|
| | | | | 2011 | 2012 | 2013 | 2014 | 2015 |
| Thurrock 3 | Roadside | 95.34 | 95.34 | 17.93 | 15.25 | 14.07 | 14.23 | 10.06 |

(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.
 (2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).
 (3) All means have been “annualised” as per Technical Guidance LAQM.TG16, valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Figure 6: Rolling Annual Mean for PM_{2.5} (automatic monitoring sites)

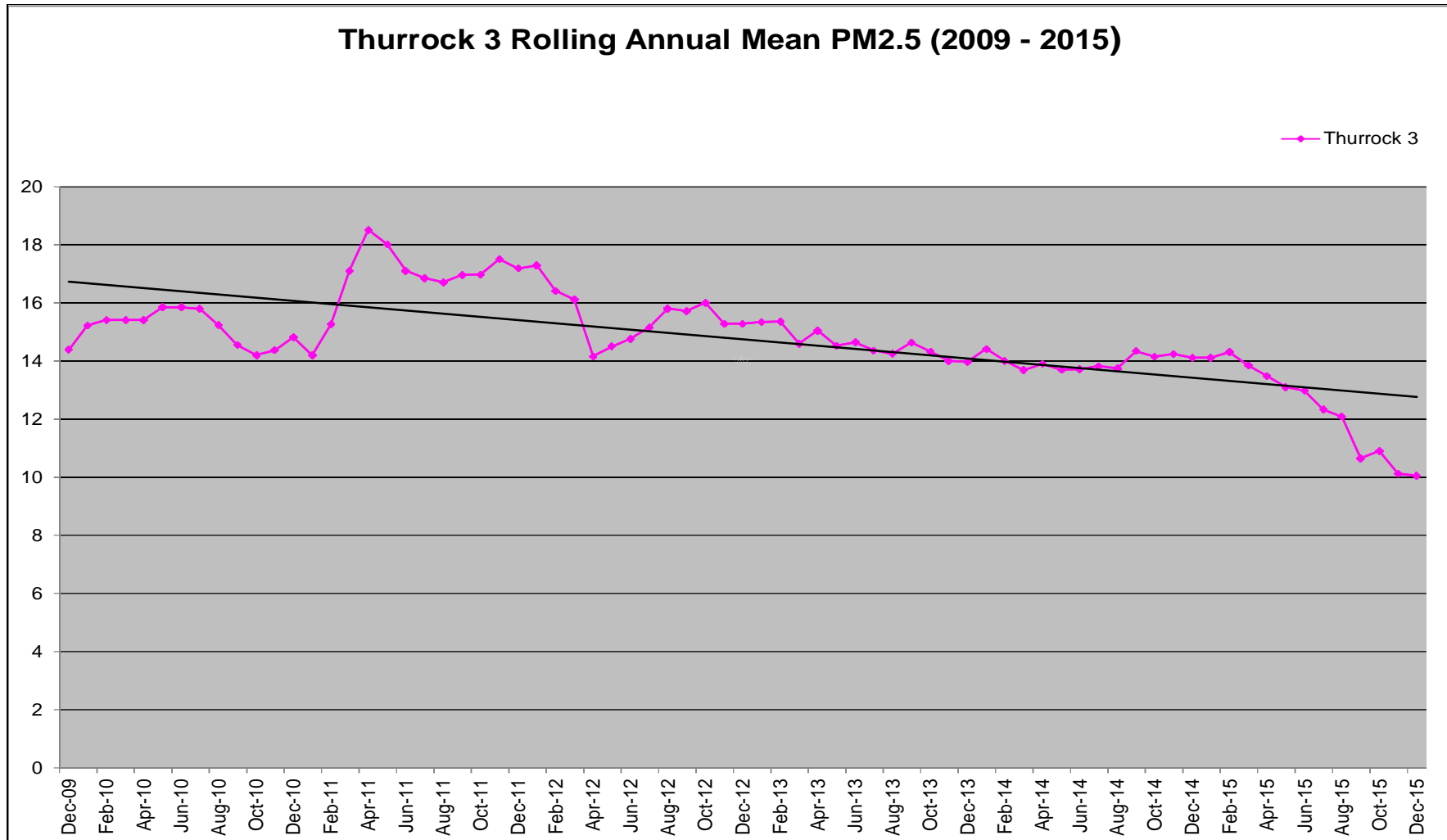


Table A.8 – SO₂ Monitoring Results

| Site ID | Site Type | Valid Data Capture for monitoring Period (%) ⁽¹⁾ | Valid Data Capture 2015 (%) ⁽²⁾ | Number of Exceedances (percentile in bracket) ⁽³⁾ | | |
|------------|------------------|---|--|--|---|--|
| | | | | 15-minute Objective (266 µg/m ³) | 1-hour Objective (350 µg/m ³) | 24-hour Objective (125 µg/m ³) |
| Thurrock 1 | Urban Background | 77.19 | 77.19 | 0 | 0 | 0 |
| Thurrock 4 | Roadside | 84.67 | 84.67 | 0 | 0 | 0 |

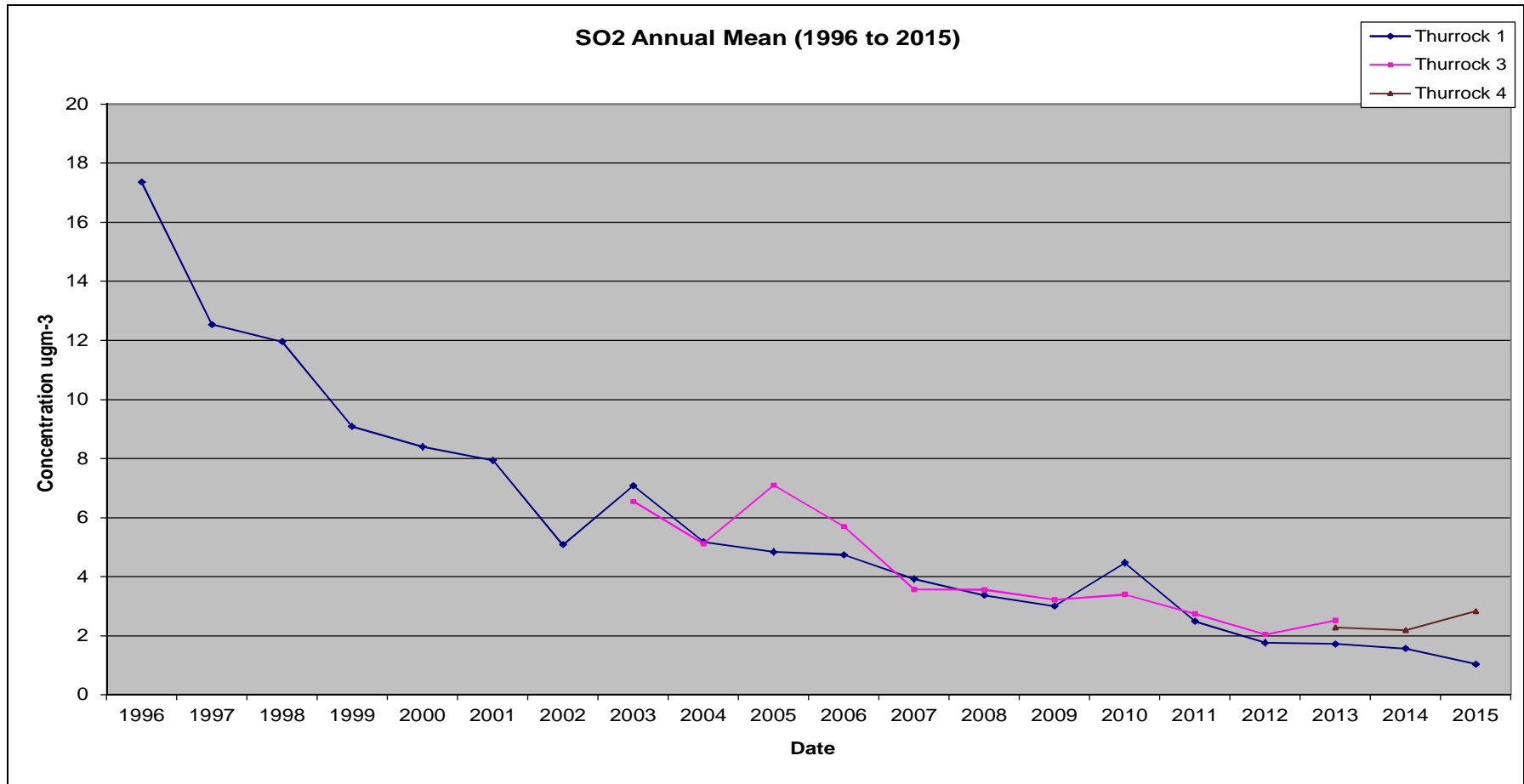
Notes: Exceedances of the SO₂ objectives are shown in **bold** (15-min mean = 35 allowed a year, 1-hour mean = 24 allowed a year, 24-hour mean = 3 allowed a year)

(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%)

(3) If the period of valid data is less than 85%, the relevant percentiles are provided in brackets.

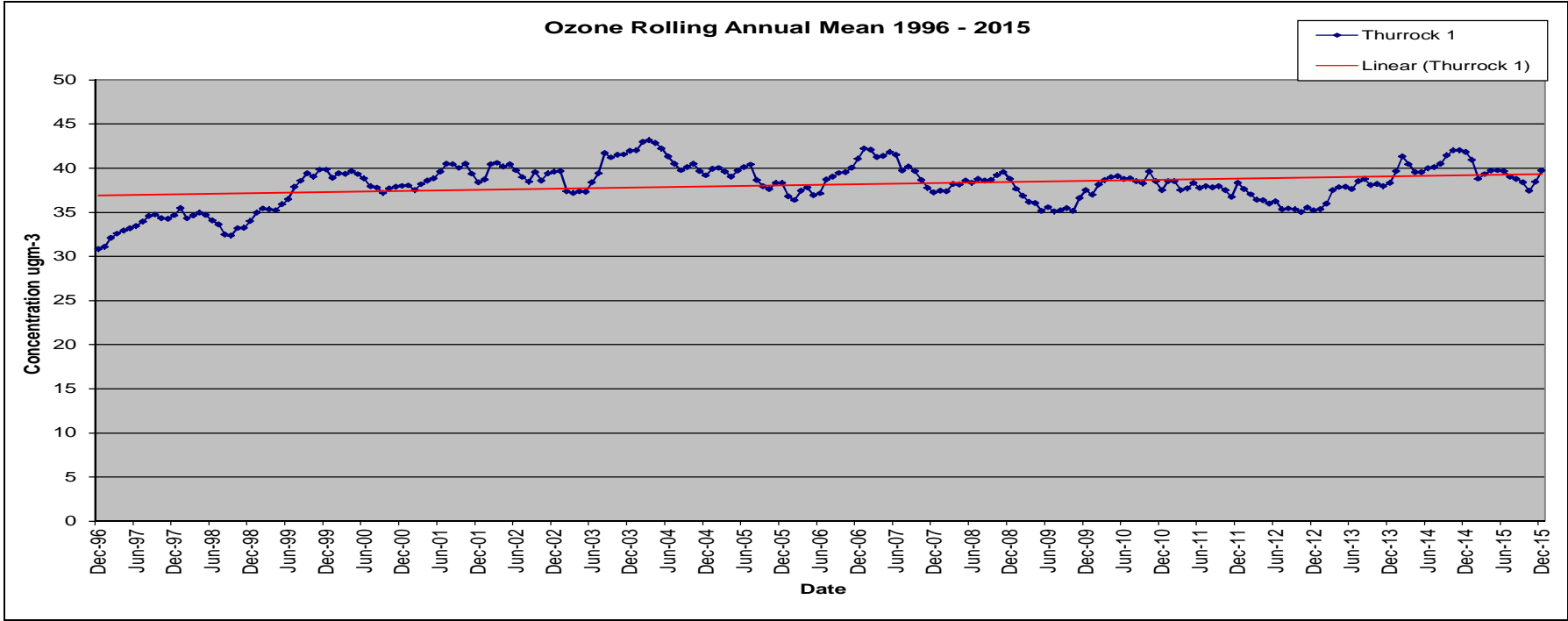
Figure 7: Annual Mean for SO₂ (automatic monitoring sites)



Ozone (O₃) Monitoring

| | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|------|------|------|------|------|------|
| No Exceedences of the Daily Maximum 100 ug/m-3 | 7 | 11 | 8 | 5 | 3 | 4 |
| Annual Mean | 38 | 38 | 36 | 38 | 42 | 42 |
| Annual mean Daily Max 8-hr | 55 | 56 | 52 | 55 | 60 | 59 |
| Air Quality Strategy Obj: Daily max 8-hr running mean 100 ug/m-3 on more than 10 days | 0 | 11 | 0 | 0 | 0 | 0 |

Figure 8: Rolling Annual Mean for O₃ (automatic monitoring sites)



Appendix B: Full Monthly Diffusion Tube Results for 2015

Table B.1 – NO₂ Monthly Diffusion Tube Results - 2015

| Site ID | NO ₂ Mean Concentrations (µg/m ³) | | | | | | | | | | | | | Annual Mean | |
|---------|--|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------------------------|--------------|
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Raw Data | Bias Adjusted ⁽¹⁾ | |
| | LRAR | 50.86 | 64.71 | 47.70 | 50.91 | 45.01 | 56.78 | 47.20 | 51.70 | 60.27 | 62.48 | N/D | 36.05 | 57.86 | 52.15 |
| PRS | 43.73 | 36.83 | 35.13 | 33.26 | 27.05 | 26.96 | 30.18 | 31.66 | 31.23 | 44.97 | 25.74 | 35.19 | 36.81 | 33.5 | |
| WC | 46.27 | 39.93 | 40.91 | 37.38 | 36.04 | N/D | 37.80 | 27.65 | 38.47 | 44.41 | 39.14 | 36.43 | 42.4 | 38.58 | |
| JC | 62.02 | 51.41 | 51.20 | 51.45 | 46.64 | 53.63 | 46.27 | 54.16 | 58.67 | 62.78 | 56.33 | 46.62 | 58.72 | 53.43 | |
| IBIS | 54.33 | 54.43 | 51.25 | 39.02 | 56.31 | 50.71 | N/D | 51.96 | N/D | N/D | 60.47 | 55.39 | 57.86 | 52.65 | |
| GDSO | 39.18 | 35.63 | 25.39 | 23.16 | 24.07 | 17.79 | 25.48 | 26.03 | 26.53 | 27.50 | 31.35 | 31.62 | 30.56 | 27.81 | |
| LT | 69.86 | 49.71 | 53.45 | 40.60 | 47.22 | 57.71 | 50.26 | 33.95 | 59.11 | 59.44 | 72.30 | 35.09 | 57.58 | 52.39 | |
| KCNO | 48.88 | 39.99 | 36.37 | 29.27 | 33.74 | 33.51 | 36.95 | 31.97 | 31.19 | 32.01 | 26.60 | 29.86 | 37.58 | 34.19 | |
| WT | 47.32 | 42.07 | 39.18 | 30.47 | 39.33 | 38.43 | 42.13 | 31.85 | 35.13 | 42.35 | 40.75 | 35.44 | 42.53 | 38.7 | |
| HR | 41.02 | 34.98 | 27.35 | 26.62 | 27.52 | 27.92 | 29.18 | 28.18 | 28.14 | 33.68 | 31.79 | 26.34 | 33.22 | 30.23 | |
| NAS2 | 68.16 | 46.53 | 50.56 | 48.13 | 49.86 | 49.11 | 52.53 | 39.59 | 57.73 | 48.26 | 44.45 | 48.38 | 55.25 | 50.27 | |
| LRSS | 46.55 | 44.38 | 38.61 | 39.59 | 44.84 | 47.79 | 45.23 | 34.34 | 37.79 | 48.23 | 31.33 | 27.13 | 44.49 | 40.48 | |
| LRG | 46.35 | 39.28 | 34.95 | 34.22 | 37.02 | 43.65 | 35.95 | 33.41 | 39.26 | 39.75 | 29.19 | N/D | 41.26 | 37.55 | |
| ER | 79.72 | 51.38 | 46.37 | 56.46 | 50.97 | 44.83 | 41.92 | 50.61 | 55.82 | 61.34 | 46.55 | 49.27 | 58.17 | 52.94 | |
| PS | 34.19 | 32.27 | 26.58 | 21.93 | 21.32 | 21.37 | 20.98 | 20.82 | 23.62 | 25.79 | 22.83 | 20.84 | 26.79 | 24.92 | |
| HL | 44.97 | 37.35 | 32.91 | 29.56 | 26.15 | 17.35 | 26.14 | 29.80 | 32.15 | 35.58 | 34.81 | 29.08 | 34.42 | 31.32 | |
| NAS1 | 34.53 | 31.52 | 26.86 | 28.94 | 28.99 | 29.83 | 29.08 | 30.17 | 31.78 | 35.78 | 26.85 | 26.34 | 33.03 | 30.06 | |
| CR | 47.44 | 34.56 | 27.95 | 28.00 | 29.42 | 31.06 | 29.30 | 30.63 | 32.61 | 39.17 | 33.18 | 29.57 | 35.98 | 32.74 | |
| SRG | 36.75 | 31.15 | 24.61 | 20.94 | 22.47 | 21.76 | 22.61 | 21.52 | 21.69 | 29.26 | 23.80 | 22.43 | 30.66 | 27.9 | |

| Site ID | NO ₂ Mean Concentrations (µg/m ³) | | | | | | | | | | | | | Annual Mean | |
|-----------|--|--------------|--------------|-------|-------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------------------------|--|
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Raw Data | Bias Adjusted ⁽¹⁾ | |
| | | | | | | | | | | | | | | | |
| NAS3 | 28.44 | 26.45 | 23.05 | 18.58 | 16.38 | 18.93 | 17.22 | 18.10 | 20.24 | 24.32 | 22.64 | 18.23 | 23.13 | 21.05 | |
| WES | 38.38 | 36.82 | 27.22 | 27.45 | 27.95 | 29.16 | 27.96 | 24.04 | 28.56 | 35.72 | 31.03 | 23.92 | 32.8 | 29.85 | |
| B | 27.55 | 18.22 | 16.03 | 14.60 | 14.06 | 14.06 | 13.40 | 14.32 | 14.72 | 16.78 | N/D | 15.09 | 17.86 | 16.26 | |
| TL | 45.10 | 33.60 | 28.64 | 29.51 | 29.88 | 28.82 | 32.81 | N/D | 29.87 | 34.13 | 29.67 | 29.55 | 35.12 | 31.96 | |
| PKSL | 34.59 | 34.38 | 28.07 | 25.91 | 29.05 | 27.03 | 24.20 | 22.59 | 25.72 | 35.42 | 25.82 | 23.53 | 30.8 | 28.02 | |
| SL | 36.75 | 31.15 | 24.61 | 20.94 | 22.47 | 21.76 | 22.61 | 21.52 | 21.69 | 29.26 | 23.80 | 22.43 | 27.38 | 24.92 | |
| M | 35.66 | 31.20 | 27.23 | 25.42 | 23.72 | 24.62 | 22.43 | 21.37 | 26.61 | 29.12 | 22.20 | 18.76 | 28.24 | 25.7 | |
| FRC | 44.64 | 35.58 | 31.82 | 29.81 | 28.65 | 28.96 | 26.29 | 22.97 | 32.00 | 38.69 | 34.43 | 29.19 | 35.07 | 31.92 | |
| TILA | 50.91 | 44.57 | 34.21 | 28.91 | 39.85 | 36.10 | 41.67 | 32.24 | 31.28 | 35.55 | 41.14 | 36.59 | 41.48 | 37.75 | |
| TILB | 45.96 | 39.95 | 42.36 | 31.87 | 36.34 | 37.53 | 39.75 | 26.71 | 36.24 | 42.12 | 34.13 | 42.58 | 41.71 | 37.96 | |
| TILC | N/D | 30.18 | 33.12 | 30.43 | 35.10 | 36.59 | 27.96 | N/D | 33.50 | 37.49 | 38.16 | 38.78 | 37.51 | 34.13 | |
| TILD | 39.81 | 37.90 | 30.30 | 27.99 | 33.01 | 34.13 | 31.66 | 29.15 | 31.23 | 32.10 | 33.64 | 29.70 | 35.77 | 32.55 | |
| TILE | 40.65 | 37.39 | 31.15 | 29.43 | 34.46 | 28.88 | 35.76 | 30.90 | 26.81 | 34.05 | 35.49 | 32.66 | 36.41 | 33.14 | |
| TK4 (A&B) | 37.74 | 32.21 | 29.82 | 29.82 | 29.91 | 30.34 | 29.80 | 27.59 | 27.91 | 33.02 | 31.24 | 30.91 | 33.91 | 30.86 | |
| PBP | 48.64 | 42.58 | 44.87 | 32.31 | 32.36 | 30.58 | 34.94 | 31.97 | N/D | 41.78 | 36.35 | 30.65 | 40.66 | 37.00 | |
| PBPA | 41.15 | 37.89 | 32.10 | 34.26 | 28.36 | 24.38 | 30.20 | 34.02 | 36.36 | 37.27 | 33.87 | 25.29 | 36.19 | 32.93 | |
| LYD | 39.14 | 36.03 | 31.98 | 22.37 | 27.65 | 31.37 | 29.94 | 30.49 | N/D | 31.46 | 31.36 | 28.58 | 34.00 | 30.94 | |
| AVSL | 36.78 | 43.15 | 39.72 | N/D | 39.30 | 41.57 | 44.02 | 42.32 | 44.34 | 48.88 | 43.74 | 41.14 | 46.45 | 42.27 | |
| AVHS | 40.29 | 35.23 | 39.11 | 38.14 | N/D | 36.86 | 33.47 | 39.30 | 41.22 | 44.60 | 32.56 | 31.86 | 41.22 | 37.51 | |
| SOAA | 37.55 | 38.77 | 32.54 | 32.67 | 24.48 | 26.98 | 26.63 | 32.34 | 27.83 | 37.36 | 28.93 | 29.68 | 34.41 | 31.31 | |
| TSR | 31.72 | 30.86 | 31.46 | 24.87 | 28.16 | 28.03 | 26.86 | 25.92 | 25.46 | 30.20 | 30.87 | 29.34 | 31.48 | 28.65 | |
| DR | 41.58 | 34.37 | 29.51 | 26.49 | 26.45 | 27.86 | 26.88 | 28.53 | 27.24 | 32.84 | 31.85 | 26.50 | 32.98 | 30.01 | |
| LRARN | 47.73 | 39.58 | 29.72 | 31.65 | 31.70 | 26.95 | 35.29 | 33.26 | 28.65 | 33.07 | 28.78 | 27.34 | 36.05 | 32.81 | |
| LRARS | 40.39 | 33.20 | 27.95 | 26.64 | 25.03 | 24.96 | 29.41 | 27.03 | 25.81 | 21.33 | 26.37 | 24.58 | 30.47 | 27.73 | |

| Site ID | NO ₂ Mean Concentrations (µg/m ³) | | | | | | | | | | | | | Annual Mean | |
|---------|--|--------------|--------------|-------|-------|-------|-------|-------|-------|--------------|--------------|-------|----------|------------------------------|-------|
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Raw Data | Bias Adjusted ⁽¹⁾ | |
| | LRARMN | 55.11 | 48.25 | 39.78 | 25.71 | 32.76 | 33.57 | 39.19 | 37.90 | 36.87 | 43.87 | 32.39 | 31.81 | 41.87 | 38.10 |
| LRARMS | 49.48 | 39.66 | 32.63 | 29.94 | 30.46 | 32.66 | 24.94 | 25.96 | 36.88 | 45.04 | 32.59 | 26.21 | 37.22 | 33.87 | |
| JRP | 35.44 | 31.94 | 29.06 | 28.50 | 22.21 | 21.54 | 21.22 | 27.14 | 29.05 | 35.52 | 21.35 | 24.01 | 29.94 | 27.25 | |
| | | | | | | | | | | | | | | | |

(1) See Appendix C for details on bias adjustment

Appendix C: Supporting Technical Information / Air Quality Monitoring Data QA/QC

Data Annualised Calculation Factor for PM10 for Thurrock 3 Stanford le-Hope Roadside site for 2015

annualised factor calculation (Annual Mean)

| site | annual mean 2015 | period mean | Ratio |
|---------------------------------------|------------------|-------------|----------------|
| A (TK1, Thurrock) | 17.08 | 17.31 | 0.986713 |
| B (BX1, Slade Green, Bexley) | 13.59 | 13.25 | 1.02566 |
| C (RB7, Ley Street, Redbridge) | 18.85 | 18.14 | 1.03914 |
| D (SK6, Elephant & Castle, Southwark) | 23.91 | 24.27 | 0.985167 |
| average Ratio = | | | 1.00917 |

| (Annual mean 2015 x Ratio = Annualised mean) | Annual mean | Ratio | Annualised result |
|--|-------------|----------------|-------------------|
| TK3 (Stanford Le-Hope) | 16.98 | 1.00917 | 17.14 |

QA/QC of Automatic Monitoring

There are a number of different organisations responsible for carrying out QA/QC at various stations and equipment at Thurrock's automatic monitoring sites.

For Thurrock 1, Grays AURN site, the QA/QC is managed by Bureau Veritas (BV) and by Ricardo AEA, the site Audits are conducted by Ricardo AEA. Service contracts do vary, all the gas analysers are maintained by Enviro Technology, and the PM₁₀ FDMs is maintained by Air Quality Monitors.

For Thurrock 3, Stanford-le-Hope site, this is an affiliated site on the AURN network and is also part of the London Air Quality Network (LAQN). The QA/QC is managed by Environmental Research Group (ERG) at King College London (KCL), the site Audits are conducted by Ricardo AEA. The Service contracts are managed by Enviro Technology.

For Thurrock 4, Tilbury site, this is also part of the London Air Quality Network (LAQN). The QA/QC is managed by Environmental Research Group (ERG) at King College London (KCL). The site Audits are conducted by Ricardo AEA. The Service contracts are managed by Enviro Technology.

For Thurrock 8, Purfleet site, this is also part of the London Air Quality Network (LAQN). The QA/QC is managed by Environmental Research Group (ERG) at King College London

Thurrock Borough Council

(KCL). The site Audits are conducted by the National Physical Laboratory (NPL). The Service contracts are managed by Enviro Technology.

Calibrations for all sites are done every fortnight by Thurrock Council Environmental Health Officers & the Air Quality Officer.

QA/QC of Diffusion Tube Monitoring

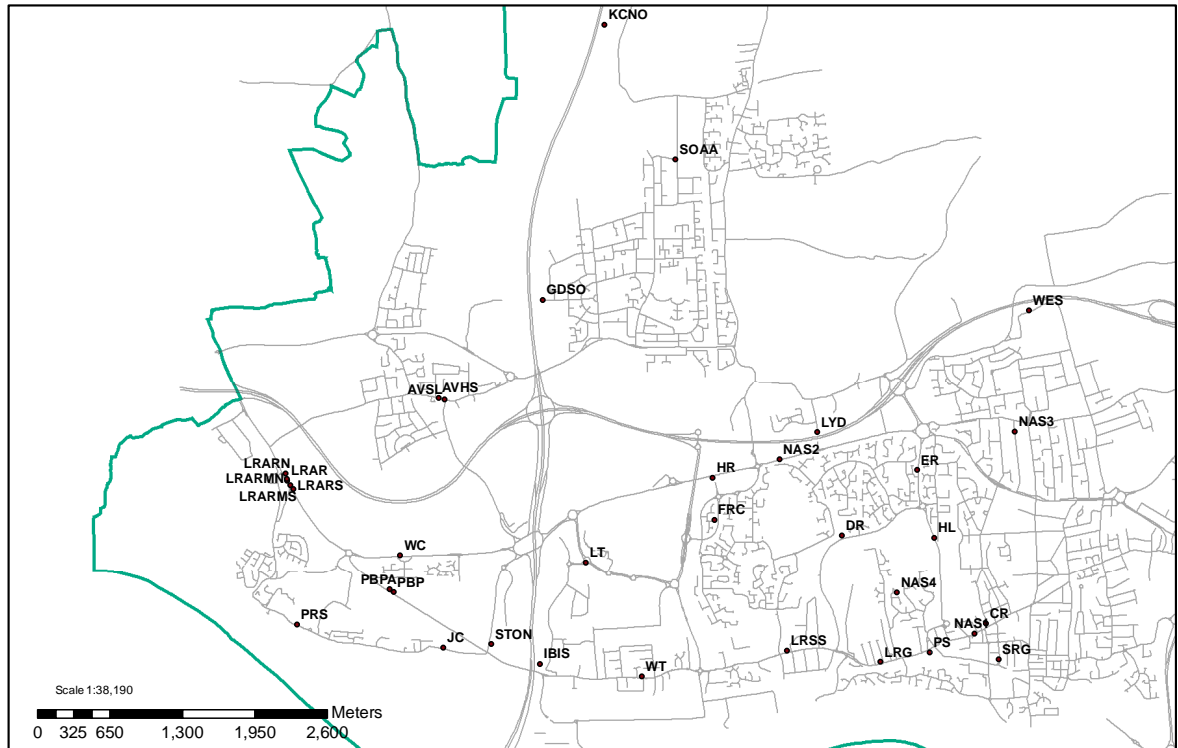
Diffusion Tube studies for Gradko analysis using 20% TEA in water over 2012 demonstrated overall Good Precision

http://laqm.defra.gov.uk/documents/Tube_Precision_2015_version_03_15-Final.pdf

[http://laqm.defra.gov.uk/documents/LAQM-AIR-PT-Rounds-1-12-\(April-2014-February-2016\)-NO2-report.pdf](http://laqm.defra.gov.uk/documents/LAQM-AIR-PT-Rounds-1-12-(April-2014-February-2016)-NO2-report.pdf)

Appendix D: Map(s) of Monitoring Locations

Figure 9: NO₂ Diffusion Tube Locations (West Thurrock)

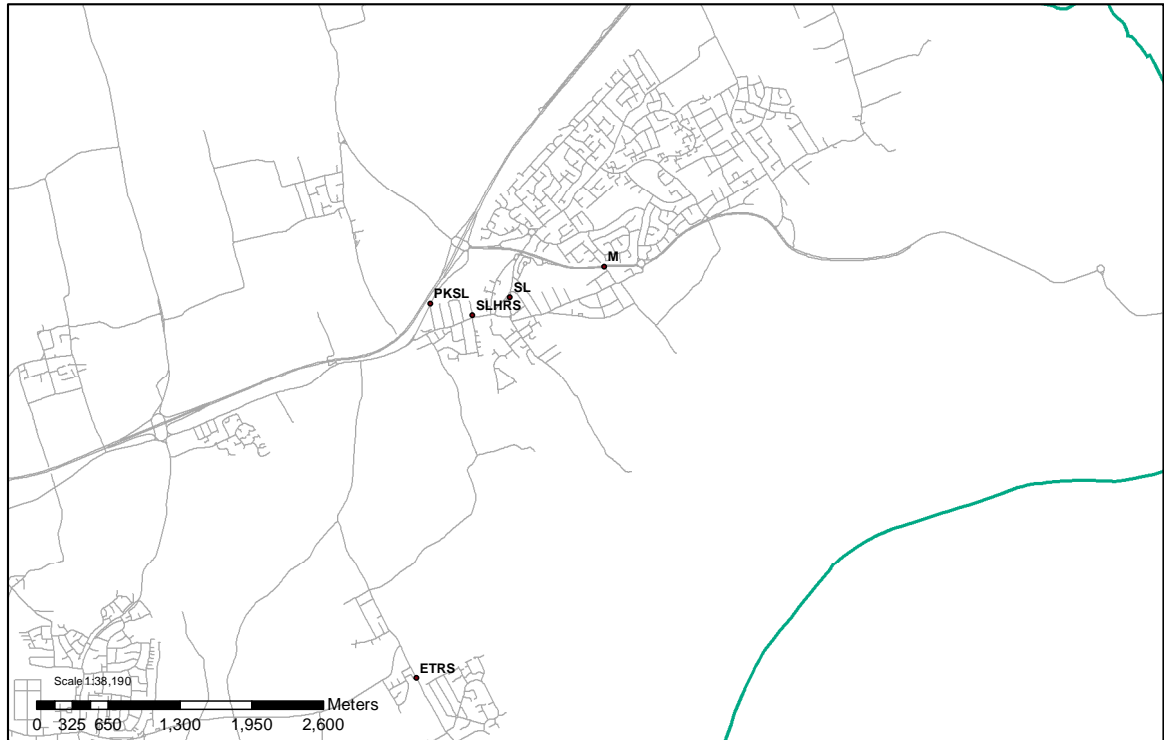


THURROCK COUNCIL
www.thurrock.gov.uk

Created by Dean Page
Pollution Control
Public Protection Department

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Figure 10: NO₂ Diffusion Tube Locations (East Thurrock)



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Figure 11: NO₂ Diffusion Tube Locations (Tilbury)

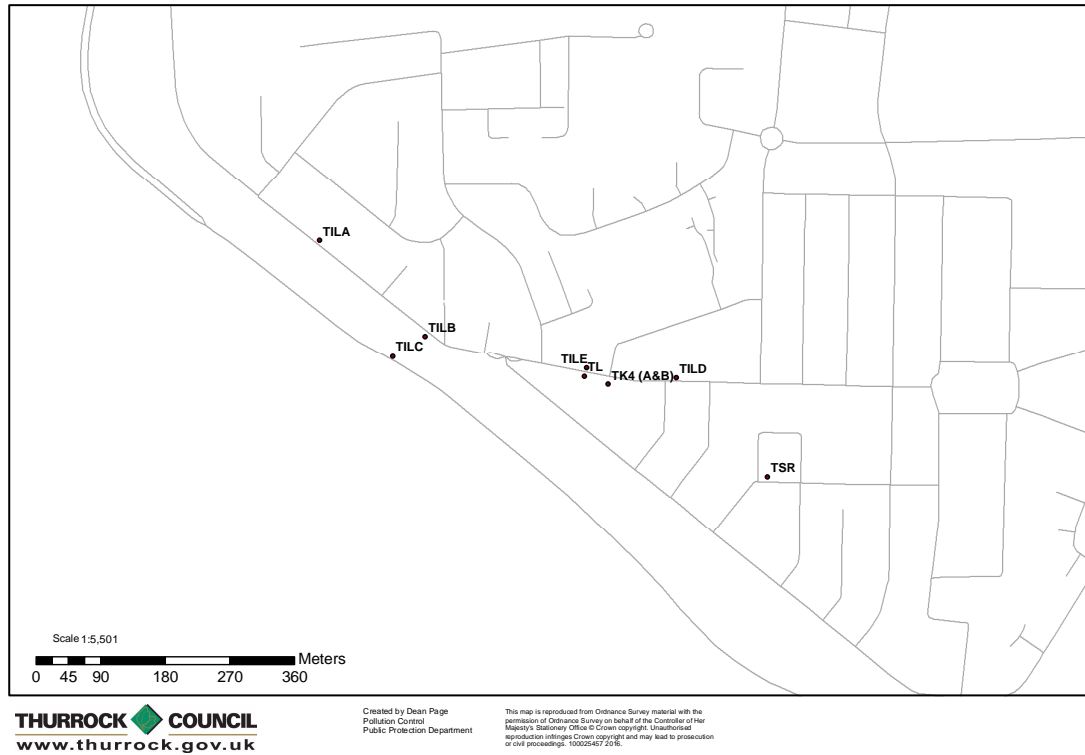
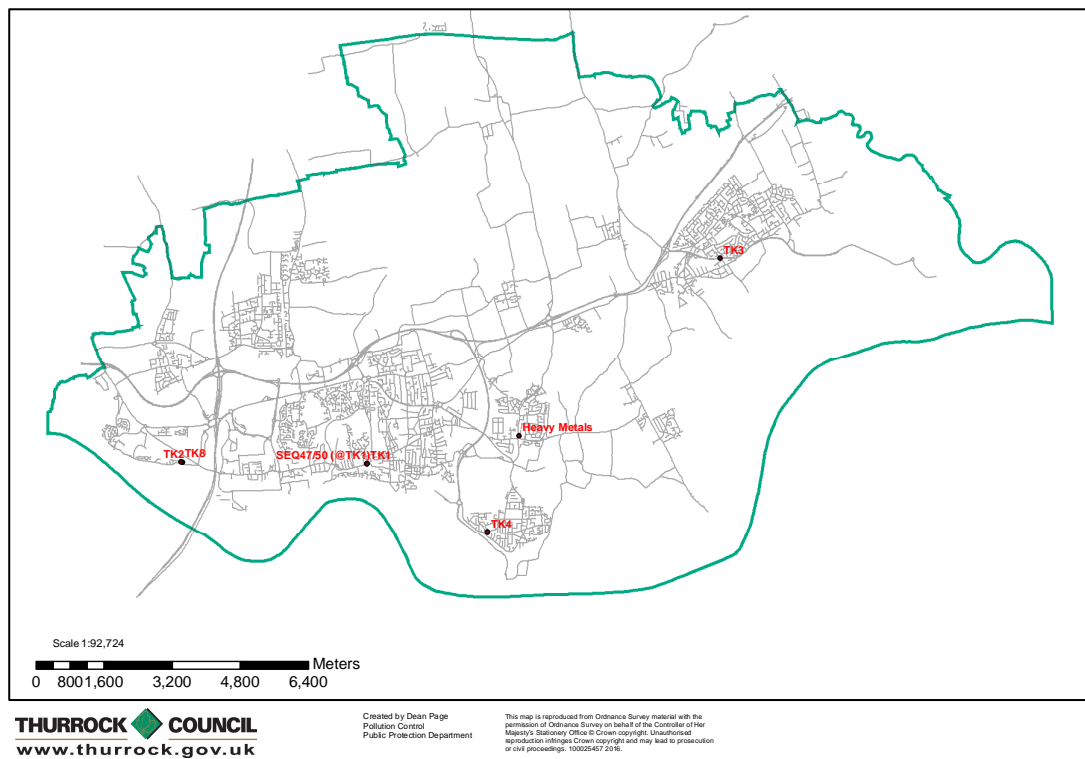


Figure 12: Automatic Monitoring sites location (Thurrock)



Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England

| Pollutant | Air Quality Objective ⁴ | |
|--|--|----------------|
| | Concentration | Measured as |
| Nitrogen Dioxide (NO ₂) | 200 µg/m ³ not to be exceeded more than 18 times a year | 1-hour mean |
| | 40 µg/m ³ | Annual mean |
| Particulate Matter (PM ₁₀) | 50 µg/m ³ , not to be exceeded more than 35 times a year | 24-hour mean |
| | 40 µg/m ³ | Annual mean |
| Sulphur Dioxide (SO ₂) | 350 µg/m ³ , not to be exceeded more than 24 times a year | 1-hour mean |
| | 125 µg/m ³ , not to be exceeded more than 3 times a year | 24-hour mean |
| | 266 µg/m ³ , not to be exceeded more than 35 times a year | 15-minute mean |

⁴ The units are in microgrammes of pollutant per cubic metre of air (µg/m³).

Glossary of Terms

| Abbreviation | Description |
|-------------------|---|
| AQAP | Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values' |
| AQMA | Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives |
| ASR | Air quality Annual Status Report |
| Defra | Department for Environment, Food and Rural Affairs |
| DMRB | Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England |
| EU | European Union |
| FDMS | Filter Dynamics Measurement System |
| LAQM | Local Air Quality Management |
| NO ₂ | Nitrogen Dioxide |
| NO _x | Nitrogen Oxides |
| PM ₁₀ | Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less |
| PM _{2.5} | Airborne particulate matter with an aerodynamic diameter of 2.5µm or less |
| QA/QC | Quality Assurance and Quality Control |
| SO ₂ | Sulphur Dioxide |
| AURN | Automatic Urban & Rural Network |
| LAQN | London Air Quality network |
| ERG | Environmental Research Group |
| KCL | Kings College London |

| | |
|----------------|---|
| O ₃ | Ozone |
| ADMS | Advanced Dispersion Model/s |
| IPPC | Integrated Pollution Prevention & Control |
| LA-IPPC | Local Authority - Integrated Pollution Prevention & Control |
| AQSD | Air Quality Strategy Document |
| NPL | National Physical Laboratory |
| | |

References

Defra, 2016. - Local Air Quality Management, Technical guidance LAQM.TG16.

Defra, London.

Defra, 2016. - Local Air Quality Management, Policy Guidance LAQM. PG16. Defra, London.

Thurrock (2015). - Local Air Quality Management – Updating and Screening Assessment 2015

Thurrock (2016). - Local Air Quality Management - Detailed Assessment for NO₂ & PM₁₀. 2016

Thurrock (2016). - Air Quality & Health Strategy, 2016